

# DC-10 Selected for AF Tanker/Cargo Mission

The U. S. Air Force has selected the McDonnell Douglas DC-10 tri-jet for its Advanced Tanker/Cargo Aircraft (ATCA) program.

Convair builds the major portion of the fuselage for the commercial versions of the DC-10, and negotiations are under way with McDonnell Douglas to fabricate the fuselage sections for the military version as well.

The announcement by the Pentagon said quantities of the aircraft to be purchased over the next five years will be determined by available funding, but that approximately 20 DC-10-30CF Advanced Tanker/Cargo Aircraft are eventually expected to be ordered.

According to the Pentagon, the ATCA's primary mission will be to increase the mobility of U. S. forces in contingency operations. The ATCA will be able to refuel deploying fighters and carry their support equipment and personnel overseas.

In addition, it will be used to refuel strategic airlift aircraft, such as the C-5 and C-141, during overseas deployments and resupply missions; refuel strategic offensive and reconnaissance aircraft during long-range operations and, in some instances, augment the Air Force's cargo carrying capability.

The ATCA program is directed by the Air Force Logistics Command at Wright-Patterson AFB, Dayton, Ohio.

The decision could mean additional work for Convair in San Diego, which was a member of the McDonnell Douglas team that submitted the proposal for the ATCA in competition with the Boeing 747 wide-bodied jet.

Like the commercial DC-10 fuselage sections, ATCA sections would be built at Convair's Lindbergh Field plant and shipped by barge to Long Beach, Calif., where the aircraft will be assembled.



An artist's concept of the DC-10 ATCA

## GD World

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### Inside the World

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## Electric Boat Division Conducts Huge Inventory

By Jim Reyburn

Gargantuan. That's the word for the wall-to-wall nine-day inventory just completed at Electric Boat division. The huge job was essentially completed two days early.

Listen to this shopping list: 5,000,000 labels, 670,000 inventory sheets (all with 10 or more line item spaces) and 180,000 tags.

The labels signified either that the material should be inventoried on a certain day or that it had already been inventoried. Items themselves were logged on the inventory sheets, and some tags ("Unidentified Material") were used to mark items that couldn't readily be identified. "Not To Be Inventoried" tags went on nonproduction material, which wasn't counted.

Handling the massive inventory task was an army of more than 10,000 Electric Boat employees at Groton, Quonset Point, R.I., and Electro Dynamic in Avenel, N.J., most of them production workers, who began the nine-day project on January 21st on a three-shift, round-the-clock basis.

The inventory was divided into three categories — 1. work in process (fabricating and shop-type materials) 2. on-hull (material on board the submarines) and 3. material (warehouse items).

How was the inventory taken? The Groton project — by far the largest — told the story. There, an 8,000-person workforce was subdivided into 500 teams composed of four to 10 people each — a supervisor, planners, counters, recorders and checkers. Five teams were headed by a team captain.

The teams operated this way: the team

captain and checker captains earmarked an area each shift. Then the teams went to work. Counters and recorders worked closely together, the counter identifying and tagging the items, the recorder logging them on the inventory form. When they finished, the forms went to the supervisors and checkers. The checkers reconfirmed the information and signed off the forms, which went to data control for keypunching and then on to data processing for entry into the computer.

An army moves on its stomach, of course, and so did the inventory takers, so cafeteria operations were stepped up accordingly. Meal serving hours were lengthened in most cases, although employees were asked to eat "on-the-fly" so the inventory work could continue uninterrupted.

Employees had to make temporary adjustments in their living habits. Many people, for instance, were assigned to shifts other than their normal ones.

Others at Groton — about 600 working in production areas that had to be closed for the inventory — were on furlough for the week. Originally, the company felt it would have to furlough 4,000 to 5,000 employees. However, by keeping some submarine production jobs going during the inventory, that number was reduced to 600. Those on furlough were given the choice of taking vacation time or filing for unemployment compensation. For those who chose unemployment comp, the company arranged with the state labor department to expedite the claims to allow minimal interruptions in income.



Checking Piping. Pipefitter Kathy Morris (left) records data given by fellow Pipefitter Albert Del Monte during Electric Boat division's huge inventory.

A special inventory task force under the direction of Walter G. Potts, Director of Material Control, worked for several weeks in planning and setting up the inventory.

The task force attended to such details as the number and selection of people needed for the inventory, the logistics of time cards, payroll and pay check delivery, increased parking at off-site inventory locations and the general flow of the inventory.

General Manager P. Takis Veliotis put

it this way in a letter announcing the inventory mailed to all employees:

"The completed inventory will establish a firm basis on which we can locate and determine the quantity of all production materials and coded stock, identify real and potential shortages and surpluses and improve our storage practices.

"In a nutshell, it will give us the assurance of knowing that we have the right materials in the right place at the right time."

## Purchases from Minority-Owned Firms Jump Fivefold in Two Years

By identifying and focusing efforts to step up minority purchases, General Dynamics purchasing departments have increased the business they do with minority-owned firms fivefold in the past two years.

The corporation's purchases from these firms have increased from \$1.8 million in 1975 to over \$11 million in 1977!

"We discovered in early 1976 that the amount of business we did with minority vendors could be substantially improved," says Everett Gray, Corporate Minority Purchasing Manager. "Purchases from minority-owned vendors represent a very small portion of the

total purchases General Dynamics makes.

"We didn't know what the right amount should be, nobody did, but with a number of major programs just beginning, we felt there was an opportunity for us to find and use new vendors that we had not done business with before."

Mr. Gray points out that divisions of a large corporation such as General Dynamics need to have as many bids submitted for each contract as possible to insure that the corporation is getting the best materials and services at the lowest cost.

"There are a lot of minority businesses that do good work in their field,

but never approached us or any large corporation," Gray says. "Maybe they were afraid of doing business with a large organization, or perhaps they didn't feel they could meet our quality standards and reporting requirements.

"Whatever the reason, we have had to find the minority firms which can meet our needs and make them aware of the opportunities."

Gray says a major problem involved in increasing business with these firms is locating them. Many organizations have directories of minority-owned firms, but these are often out of date, and, as a result, waste a lot of the purchasing agent's time.

An exception, he says, is the National Minority Purchasing Council's data bank listing. The Council was founded six years ago as a joint venture of private industry and the Department of Commerce. It maintains a listing of minority-owned vendors and their commodities and services that are available to member firms. GD joined the Council and has used its information to locate minority suppliers across the country.

"We are very pleased with the results of our efforts," Gray says. "Minority vendors we are now using run the gamut from a highly technical engineering service to a fuel oil supplier."





**Presidential Commendation.** Roy V. Woodle (center), Corporate Director of International Operations, is presented a Presidential Commendation for his efforts to obtain pledges from businesses to hire and train veterans under the HIRE program. On hand for the presentation at the White House, from the left, were: G. William Miller, Chairman of the HIRE program who has been nominated by President Carter to serve as Chairman of the Federal Reserve Board; Woodle, and Secretary of Labor Ray Marshall. Mr. Woodle and Lyman C. Josephs, Corporate Vice President-International, were awarded the Presidential Commendation.

## General Dynamics Is Supporting Vietnam Veteran Hiring Program

General Dynamics has made an initial pledge to hire 1,000 Vietnam veterans and place them in jobs. The pledge is in cooperation with a program called Help through Industry Retraining and Employment (HIRE), an organization which hopes to secure permanent jobs for 100,000 veterans, handicapped veterans and others.

The company has already hired 400 persons under the HIRE program, and has actively solicited other companies to join the effort.

Recently, Lyman C. Josephs, Corpo-

rate Vice President-International, and Roy V. Woodle, Corporate Director of International Operations, were presented commendations by President Carter for their roles in securing pledges from firms in the St. Louis area.

Under the HIRE program, the federal government has earmarked \$140 million to reimburse firms for on-the-job training. Some companies are making use of these funds, while others are voluntarily absorbing the cost of training the veterans themselves.

## Tomahawk Is Flying Against Representative Air Defenses

Convair's Tomahawk cruise missile has begun a series of survivability assessment flight tests in which the fast, low-flying missile is pitted against a variety of defense systems. The tests will determine under which specific circumstances, if any, the missile becomes vulnerable to enemy air defenses.

According to the Department of Defense, the series of tests will assess the present capabilities of cruise missiles to penetrate enemy defenses by deliberately exposing them to representative air defense systems.

A senior defense official has said the defense systems would be given increasing amounts of information as the tests continue until, eventually, a missile will fail to penetrate them. The aim is to determine what air defenses will defeat a cruise missile.

During the first free-flight test, a Tomahawk was launched from a jet aircraft and flew past a test radar site where components of air defense systems attempted to acquire and track the missile. Results of the test were not announced for security reasons. Other tests will involve the improved Hawk surface-to-air missile system and air-to-air mis-

siles such as the AIM-7 Sparrow, the AIM-9 Sidewinder and the AIM-54 Phoenix.

The initial tests in the cruise missile survivability assessment program will not include a "live firing" of either a surface-to-air or air-to-air missile.

The survivability tests are scheduled to run through 1979 and will be carried out at four locations—White Sands Missile Range in New Mexico, the Naval Weapons Test Center, China Lake, Calif., the Pacific Missile Test Center, also in California, and the Nellis AFB Test Range in Nevada.

### W. B. Forti Appointed To Development Post

William B. Forti has been appointed Director of Corporate Development. He will be responsible for guiding the Corporate Strategic Plan, assisting the divisions and operating units in developing their own strategic plans and performing analysis of potential expansion into new business areas.

He previously was with International Paper Co. where he was Manager of Business Development for the largest group and previously held the position of Manager of Corporate Development Projects at the company's head office.

Prior to International Paper, Mr. Forti spent four years with Bendix Corp. in planning, finance and business development.

He has served as a staff economist with the U.S. Congress and as a financial analyst with the Securities and Exchange Commission.

He is a graduate of the University of Richmond where he received a Bachelor of Science degree in economics in 1963 and a Master of Science in finance and economics in 1964.

### From the Chairman

In today's highly competitive world, the quality of a company's products is the most important key to success. General Dynamics depends on the quality of its men and women to meet its product quality goals. For this reason, it is our policy to recruit, hire, train and promote qualified individuals throughout the company without regard to race, color, religion, sex, age or national origin.

To ensure that all applicants and employees are treated fairly and equally, employment decisions must always be based on valid and consistent requirements. This applies to all personnel actions including compensation, benefits, transfers, layoffs, returns from layoff, training, education and social recreational programs. Members of our management team must, therefore, dedicate themselves to the principle of equal employment opportunity, seeing to it that equal opportunity exists in practice as well as in policy.

We are continuing to set demanding goals in the Affirmative Action Program in each division and positive efforts by all levels of management are necessary if we are to meet these goals.

*D.S. Lewis*

David S. Lewis  
Chairman

## Sub Tender Named for an EB Official

The U.S. Navy has named a submarine tender now under construction for the late Andrew I. McKee, a former GD Vice President and Director of Research and Design at Electric Boat.

In assigning the name to the 643-foot, 22,000-ton AS-41, Secretary of the Navy W. Graham Claytor Jr. called Mr. McKee a "pioneer of modern submarine design and development from the age of diesel propulsion into the nuclear power era."

McKee served as Officer in Charge of Submarine Design in the Department of the Navy from 1926 to 1930 and was Design Superintendent of the Portsmouth Navy Yard from 1938 to 1945, a period of rapid development and construction of the World War II submarine force.

In the closing days of the war, he served with the Pacific Fleet and was

awarded a Bronze Star for heroism. He then became commander of the Philadelphia Naval Shipyard until his retirement from the Navy as a rear admiral in 1947.

McKee then joined EB as Design Director and made significant contributions to the design and construction of a major portion of the Navy's undersea fleet. He retired in 1974 as senior technical advisor at the shipyard. McKee died in 1976.

The submarine tender *McKee* is being built by Lockheed Shipbuilding and Construction Co. of Seattle and is scheduled for launching in the fall of 1979.

Two other ships in the class are named for former EB officials—Emory S. Land, an EB director, and Frank T. Cable, a vice president of an Electric Boat subsidiary early in the century.

## Around the World... ...in GD

**At CHQ:** Michael B. Klug has been appointed Corporate Manager-International Business Development... James V. Bliss has been named Acting Director-Corporate Taxes... Marlene E. Carver has been promoted to Corporate International Administration Manager... James Moore transferred from Electric Boat as Senior Tax Accountant... Elliott Blevins was named Assistant Librarian.

**At DatagraphiX:** Gary W. Pack was promoted to Manager of Marketing Operations... René Gallet joined as Manager of Supplies/Sales.

**At Electronics:** Wallace M. Akimoto was promoted to Senior Project Manager... Vernon L. Biaett was promoted to Engineering Section Head... Richard O. West joined as Program Manager... Jim Collins has been named Marketing Manager-Global Positioning Systems.

**At Stromberg-Carlson:** Nihar E. Pal and Jay R. Shah have been promoted to Engineering Group I Supervisor... Steven G. Peters has been named Manager Engineering Personnel... Roland Coblenz has joined as Manager, International Contracts... Robert D. Francis joined as Manager, Regional Sales.

**At Convair:** Glenn W. Bancroft was promoted to Group Engineer... George M. Esslinger was promoted to Manager-Operations Programs (Tomahawk)... James E. Hicks and Kenneth Odom were promoted to Project Engineer... Joel Sucov has joined as Project Engineer... J. R. Thayer transferred from Fort Worth as Development Project Engineer... Delano A. Brouillette was hired as Design Specialist.

**At Electric Boat:** Charles F. Dow was promoted to General Superintendent... John J. Gagnon was promoted to General Superintendent-Piping... Jack T. Kneeland was promoted to Chief of Test... Robert H. Rathbone was promoted to Manager-Nuclear Test.

**At DSS:** H. M. Maculsay was named Chief-Data Systems-WDSC... Donald W. Barrett was promoted to Manager-Systems Development & Programming-EDSC... James W. Ausley Jr. was promoted to Data Systems Supervisor-WDSC... Bernard J. Breen transferred from EDSC to CHQ as Corporate-Wide Applications Consultant-DSS.

**At Pomona:** Paul A. Nelson joined as Manufacturing Development Specialist Sr... Frank V. Pirolo was promoted to Section Head.

**At Fort Worth:** Louis M. Pisz was promoted to Manager of Quality Assurance.

**At Freeman United:** Kenneth E. Barker joined as Maintenance Superintendent.

## Savings And Stock Values

The GD Savings and Stock Investment Plan unit values for the month of November 1977 were:

### Salaried:

Government Bonds	\$1.9401
Diversified Portfolio	\$1.2231

### Hourly:

Government Bonds	\$1.9401
Diversified Portfolio	\$1.2495
General Dynamics Stock	\$48.250



## Con-Trib-Club Makes Record Pledge to Local Groups

The Convair employees' Con-Trib-Club Board of Directors has earmarked \$327,500 for the United Way/CHAD 1977-78 campaign, the largest single pledge by a group of industrial employees in the history of federated giving in San Diego County.

Ray Mendoza, Con-Trib-Club Chairman, attributed the sizable pledge to increased employee participation in giving. Members of the club's board of directors were on hand at a recent United Way/CHAD report meeting to present the pledge.

In other actions by the Club's board, grants and pledges totaling \$28,700 were allocated to 14 care, health and youth organizations in San Diego County during the third quarter of 1977.

The Girls Club of Chula Vista was pledged \$5,000 for its building fund. Grants included \$5,000 to Children's

Hospital to care for abused children; \$2,800 to the City Rescue Mission for equipment; \$2,500 for research on Amyotrophic Lateral Sclerosis; \$2,000 to the Boy Scouts of America for a sustaining membership; \$2,000 to the Elementary Institute of Science for operating expenses, and \$1,700 to the Bayside Settlement House for a remodeling project.

Also \$1,700 to the Union of Pan Asian Communities for remodeling; \$1,500 to the Boys Club-Clairemont for equipment; \$1,500 to the Neighborhood House for senior citizen programs; \$1,000 to the Family Service Association for equipment; \$1,000 to the Muscular Dystrophy Association for operating expenses; \$500 to Horsemanship for the Handicapped for operating expenses, and \$500 to the San Diego Council of Community Clinics for supplies.

## Convair to Build Composite Shell For an Earth Resources Satellite

The composite shell for a new optical camera of a future Earth resources satellite is being developed by Convair engineers.

Working under a recently awarded contract from the Santa Barbara Research Center, a Hughes Aircraft Co. facility, Convair technicians will design, build and demonstrate a test model of the satellite's structure that will house the camera.

The structure will be used on an orbital camera system on the Landsat D Earth resources satellite. The new camera is part of a "thematic mapper" which has greater capacity than previous mappers and will provide much higher color sensitivity. The adjective "thematic" comes from the instrument's capability to narrow resources into groups or themes.

According to Gary Krumweide, Program Manager, the potential for future business to Convair is for a minimum of two additional structures—an engineering model and a prototype unit. Each of the structures is approximately 4 feet long and 20 inches in diameter.

"We have already developed optical metering structures for the High Energy Astronomy Observatory, as well as high resolution mirror assembly cylinders and a graphite epoxy metering shell for a half-scale large space telescope," Mr. Krumweide said.

Explaining that all of the structures used some type of modulus graphite epoxy material in their construction, he pointed out that "the physical properties of this material have made possible lightweight, low-cost, highly stable optical systems for space applications."

## Pair Awarded Scouting's Silver Beaver

Two San Diego area employees who work at GD facilities have been awarded the Silver Beaver, the highest award in Scouting.

The two are: James P. Wilson, a quality assurance specialist for Defense Contracts Administrative Services Production, located at Convair, and Charles S. Hardisty, a plant engineer at Electronics.

A National Court of Honor confers the Silver Beaver Award to individuals for "distinguished service to boys," and the award is then presented on the local level as the highest honor a council can give.

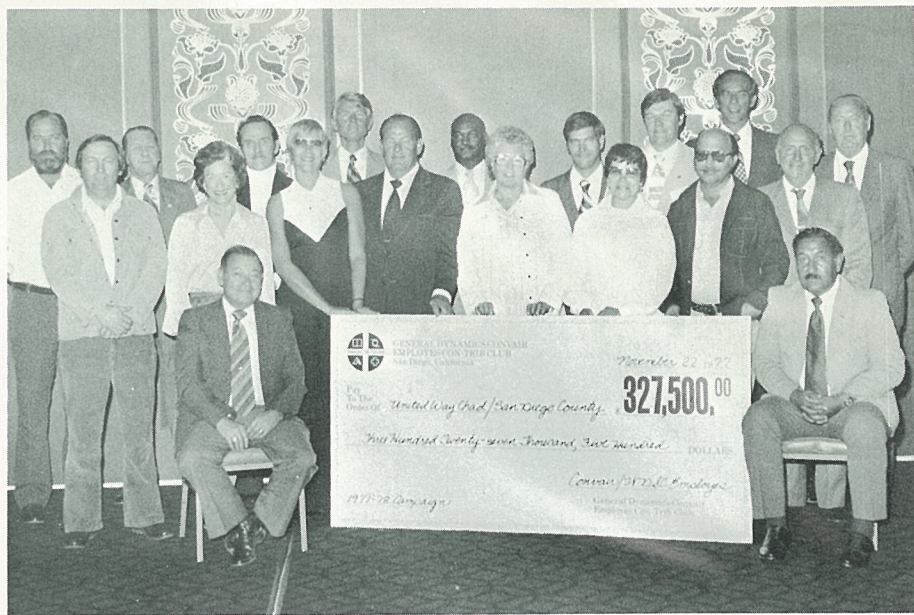
The two were among 16 Silver Beaver winners selected from more than 11,000 adult volunteers who lead 23,000 Cubs, Boy Scouts and Explorers in the San Diego area.

## Anderson, Currier Appointed to Posts

Bob Anderson and John Currier have been appointed to managerial positions at Electronics division.

Mr. Anderson joined the division as Manager of Marketing for Tactical Data Systems and will be responsible for sales and promotion of the PPS-15 radar, the Global Positioning System user equipment, display systems and radomes. He is a graduate of the University of Wisconsin and has been associated with Teledyne Telemetry Co., Brown Engineering Co., Rockwell Autonetics and Honeywell. Most recently, he was founder and president of Emhiser-Rand Industries in San Diego.

Mr. Currier has been appointed F-16 Avionics Intermediate Shop (AIS) Program Director. He joined Electronics in 1976 as Deputy Director F-16 AIS after working in the automatic test systems field for RCA. He is a graduate of Northeastern University and Drexel Institute of Technology.



**Big Pledge.** The Convair Con-Trib-Club pledge of \$327,500 was big in size as well as dollars. Members of the group's board of directors presented the pledge at a recent meeting of United Way/CHAD. Seated are: Jack Martin, Con-Trib Vice Chairman (left) and Art Medrano, Con-Trib Treasurer. Standing (left to right, in front row) are: Richard Smith, Convair; June Crosby, CHAD Deputy Chairman; Lynne Sundling, guest; Herb Billings, Convair; Darlene Sanderson, WDSC; Betty Taylor, Con-Trib Secretary; Jim Hurd and Bob Volle, Convair. In back row (left to right) are: Frank Hogan, Convair; R. R. Richardson, San Diego/Imperial Counties Labor Council AFL-CIO; Roy Johnson, Convair; Kim Fletcher, United Way/CHAD General Campaign Chairman; W. H. McIntosh, Mort Blatt, and Marv Holmberg, Convair; Ray Mendoza, Con-Trib Chairman, and John Riley, Large Employer Division Chairman.



**Winter Workers.** Old Man Winter forced some outside material inside for inventory at Electric Boat division. From the left, Gene Howard, Angelo Cofone, Ivan Anderson and Earl Wheeler clear a pallet box which was just run inside by a fork lift.

## Service Awards

### 35 Years

**Operations:** R. L. Shinn, J. De-Hope, J. M. Rice.

### 30 Years

**Material:** M. M. Wood.

**Operations:** M. R. Burris, A. C. Yoakum, C. B. Herndon, R. G. Norell, D. Salvatierra Jr., S. Montoya, H. Islava, V. D. Hodges, P. Poche.

### 25 Years

**Industrial Relations:** A. B. Daddi.

**Quality Assurance:** S. W. Graves, M. L. Stone, H. R. Miller.

**Finance:** O. D. Robertson, C. J. Black.

**Operations:** F. W. Patterson, C. C. Cope, R. H. Harter, A. E. Morrell.

**Data Systems Services:** J. E. Wallace, P. S. Kelly.

**Launch Vehicle Programs:** W. W. Elkins.

**Material:** I. W. Apostoles.

**Research and Engineering:** F. D. Winston.

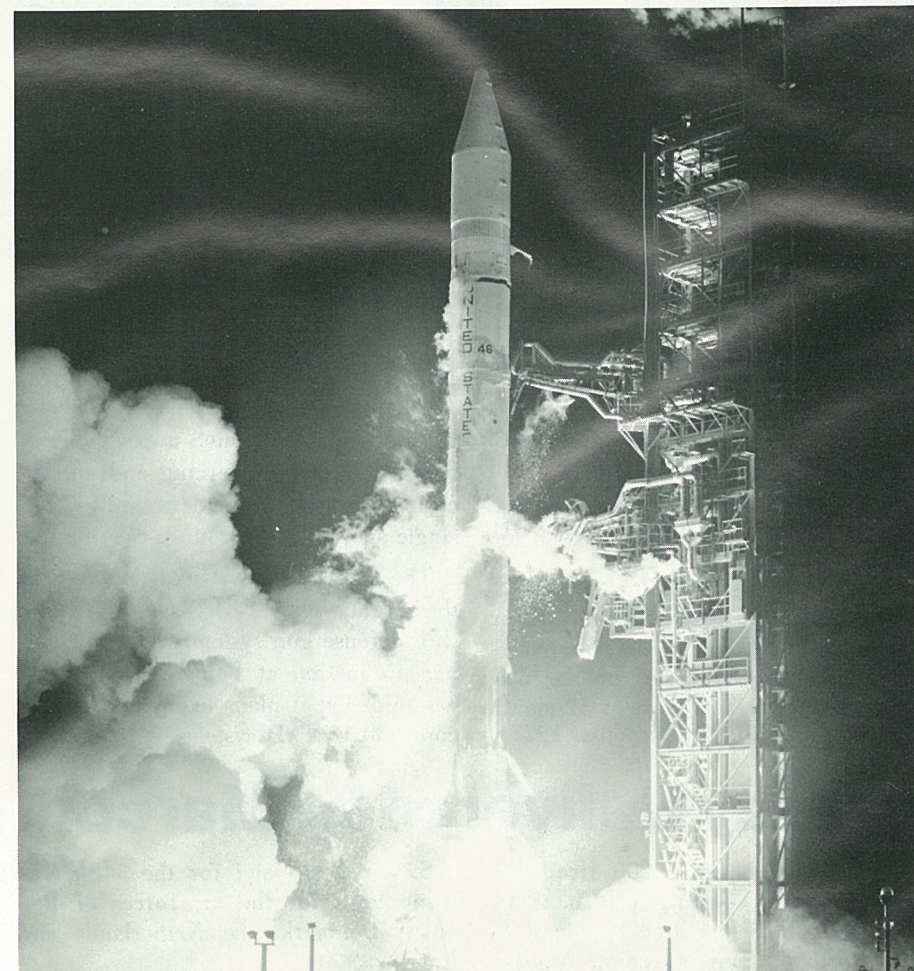
**Marketing:** C. C. Brewer.

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Fred Bettinger, Jack Isabel—Contributing editors, Convair Edition



**Blast Off.** A Convair built Atlas-Centaur launch vehicle lifts off from the John F. Kennedy Space Center carrying an Intelsat IV-A commercial communications satellite into orbit. The January 6 launch was the 11th time an Atlas Centaur successfully boosted a commercial communications satellite into orbit.



# SOTAS Helps Army in Exercise in Germany



**Eye in the Sky.** A U.S. Army helicopter with a SOTAS radar underneath, prepares to take off for a mission during REFORGER '77 held in West Germany.

By Heidi Kauderer

A radar system developed by Electronics division proved to be a key element in formulating U.S. Army battle tactics during the REFORGER '77 exercise in West Germany.

Electronic's Stand-Off Target Acquisition System (SOTAS) demonstrated its capabilities for surveillance, target acquisition and command and control under simulated battlefield conditions during the exercise.

Battle strategies were formulated using the displayed data of moving targets which were provided by SOTAS in real time as troops of the Orange and Blue Armies, their guns, tanks and convoys advanced toward each other.

SOTAS used its helicopter-borne radars to look deep across battle lines to locate "enemy" buildup areas, convoys and vehicles. The information obtained by the radars is then transmitted for immediate display to ground commanders and their staffs.

According to Bob Baker, Program Manager, SOTAS was operated by military personnel of the 3d Infantry Division which was on the Orange side during the exercise last fall.

"As the helicopters scanned the battlefield," Mr. Baker said, "SOTAS provided immediate intelligence on Blue force activity and location to the Orange force Division Tactical Operations Center and fire support elements.



**Divisional Display.** The SOTAS display trailer (center) was located at the camouflaged Orange Force division tactical operations center during REFORGER '77.

"Despite adverse weather conditions and operations around the clock, SOTAS was able to detect and track the movement, buildup and withdrawal of the opposing Blue forces far beyond the sight of a forward observer," Baker said.

SOTAS also supported air strikes by GD-built F-111 fighter-bombers while continuously monitoring the battlefield.

The battlefield exercises took place about 50 miles west of Munich in a 3,000 square mile area. Baker said live ammunition was not fired during the exercise, and referees determined what equipment was to be considered damaged, destroyed or contaminated, and how soon it could be put back into use.

With the help of SOTAS' surveillance and tracking capability, the Orange Army successfully forced the Blue Army across the Danube River that served as its base line — thus ending the exercise.

REFORGER '77 was a combined American, German and Canadian effort and marked the second time SOTAS played a vital role in the exercise.

"It was a valuable experience for our systems engineers to take SOTAS to REFORGER in 1976, bring it home for modifications and then return to REFORGER '77," Baker says.

Following the exercise, the division received a contract to produce two more SOTAS's for delivery next year to the Army in Europe.



Photo by Tom Rule

**Business Briefing.** James M. Beggs (Right), Corporate Executive Vice President — Aerospace, briefs students and professors of the Industrial College of the Armed Forces on the operation of GD. The group recently visited the corporate headquarters in St. Louis as part of a field study program.

## Pomona Awarded Army DIVAD Contract

The U.S. Army has awarded contracts to Pomona division and Ford Aerospace & Communications Co., a unit of Ford Motor Co., to build prototypes of the new Division Air Defense (DIVAD) gun system.

Pomona received a contract for \$39.1 million, and Ford received a contract for \$39.6 million. Each of the companies will build two prototypes of the new system. The contracts cover a 32-month period (see *GD World*, December 1977).

The Pomona DIVAD system includes two 35-mm. guns which are capable of firing both armor piercing and anti-aircraft rounds at selected fire rates of a single shot to 1,100 rounds per minute.

The fire control system is based upon the highly-successful Phalanx close-in ship defense gun system which is entering production at Pomona. The Army has said that it plans to eventually procure 600 DIVAD systems.

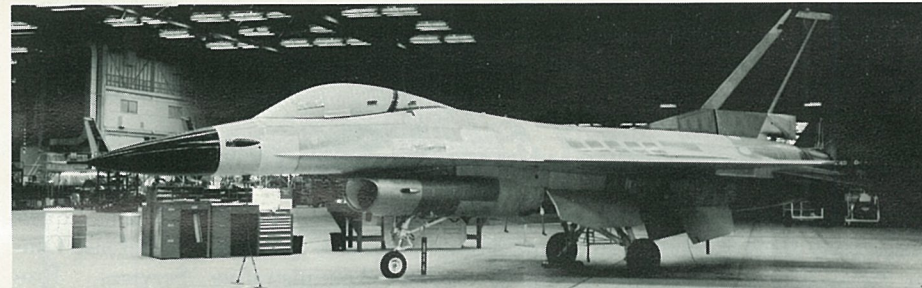
## Display Delivered by Marconi

The first of nearly 1,000 Head Up Display (HUD) systems for the F-16 multirole fighter has been delivered to Fort Worth by Marconi-Elliott Avionic Systems, Ltd. of Rochester, Kent, Great Britain.

Marconi is producing the HUD systems under a \$62 million contract to supply HUDs for 650 F-16s for the

U.S. Air Force and for the 348 F-16s being built for the air forces of Belgium, Denmark, the Netherlands and Norway.

The HUD provides F-16 pilots with all the essential information they need for navigation and weapon aiming in a display located so the pilot does not need to look down at the instrument panel.



**To Paint Shop.** F-16 No. 7 is towed to the Fort Worth paint shop to receive its coat of grey camouflage paint. This aircraft and F-16 No. 8, a two-seat fighter-trainer, will be used to gauge maintainability and reliability standards for the F-16.



**Museum Piece.** Visitors at the Smithsonian Institution's National Air and Space Museum in Washington look up to the U.S. Navy Tomahawk cruise missile. The Convair-built missile, which was used in wind tunnel testing, was given to the museum on January 10th.



# Two Tomahawks Launched from U.S. Navy Submarine

The Tomahawk cruise missile passed a major milestone on February 2d when it was launched for the first time from an operational nuclear attack submarine.

A few seconds after being fired from a torpedo tube of the USS Barb, the Tomahawk missile blasted from beneath the surface of the Pacific Ocean under power of its boost motor. After achieving cruise altitude the missile jettisoned the motor, started its air-breathing turbofan engine and carried out a successful test against an inland target at Edwards AFB, Calif. It was the first time that the missile carried out a land-attack mission after an underwater launch.

Observers along the steep and jagged eastern cliffs of San Clemente Island cheered the Tomahawk's success, including David S. Lewis, GD's Chairman, Dr. William J. Perry, Defense Under Secretary for Research and Engineering, and Capt. Walter M. Locke, Joint Cruise Missile Program Office Project Manager.

Meanwhile, a Navy and GD test team aboard the Barb readied another Tomahawk for a second test flight less than three hours later.

In the first flight, all major objec-



**Crossing Coast.** Tomahawk Cruise missile crosses California coastline on way to Edwards Air Force Base after launch from the nuclear submarine USS Barb.

tives were met, including underwater ignition of Tomahawk's solid propellant boost motor and the midair start of its cruise engine.

The missile was guided to the Pacific

coastline by its on-board inertial navigation set, and, once over land, it used its Terrain Contour Matching system to reach the recovery area at Edwards.

The flight lasted 47 minutes and

ended when the missile's wings were retracted and recovery parachutes were deployed.

Ralph MacKenzie, Convair Vice President - Cruise Missile Programs, said, "This launch and flight demonstrated the Tomahawk's launch concept and capability to be fired from the torpedo tube of an attack submarine.

"It also demonstrated that it could fly many miles across ocean and land and attack an inland target with tremendous accuracy," he said.

"With this launch and flight the Tomahawk weapon system and its capability came of age in this decade of advanced weapon systems, and promises to alter the offensive and defensive systems of the world in the future," Mr. MacKenzie said.

The second Tomahawk launch was scheduled as an antiship test flight. After emerging from the water under the power of its boost motor, the flight terminated prematurely, when, shortly after booster separation, the vehicle lost altitude and struck the water. Indications are that the missile's turbofan engine did not start.

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# GD World

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## F-16 Fuselage Assembly Begins in Europe

The first European F-16 assembly line started up February 15th, when assemblers at the Fairey S.A. plant at Gosselies, Belgium, began joining three fuselage sections of the multirole fighter.

The sections had been manufactured by Fort Worth Division, and contained essential electrical and hydraulic systems. Fairey will mate the sections and attach the fighter's European-built wings, tail and landing gear.

Final assembly will take place at SABCA, another Belgian aerospace firm at Gosselies. The completed aircraft will be delivered to the Belgian Air Force in early 1979.

While assemblers worked to join the three fuselage sections at Fairey, other workers at the plant were busy on sub-assembly of the first of more than 600 F-16 aft fuselage sections which will be used in both European F-16s and in those produced at Fort Worth.

At the same time, across the airport runway at Gosselies, SABCA workers were readying three large hangars and other facilities which will be used for final F-16 assembly and initial flight checkout.

In the Netherlands, work continued at the Fokker-VFW plant outside Amsterdam, where the second European pro-

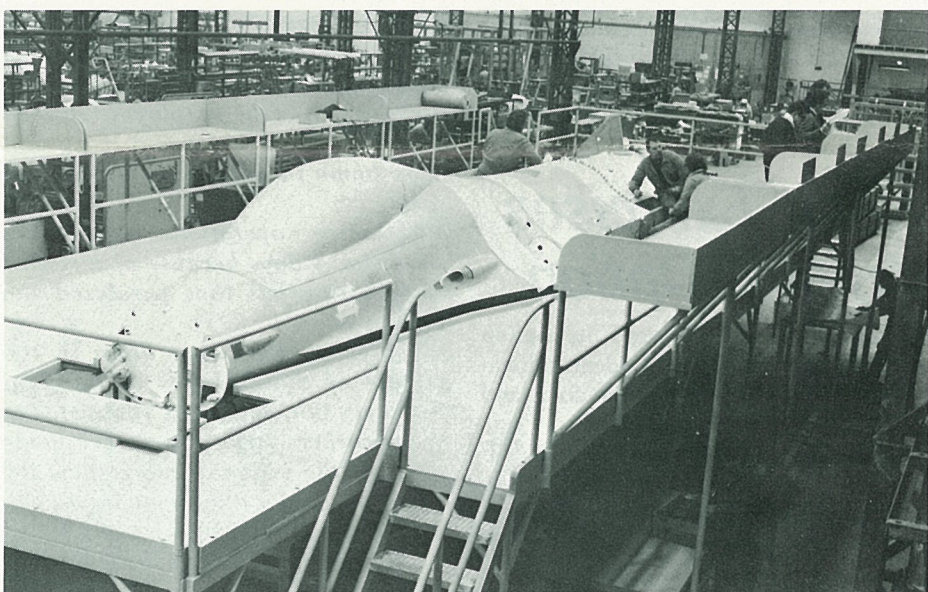
duction line will begin assembling F-16s later this spring.

The two European assembly lines will turn out the 348 F-16s ordered by the governments of Belgium, Denmark, the Netherlands and Norway to equip their air forces.

Under the unusual multinational co-production program worked out for the F-16, some components of the aircraft assembled at Fort Worth will be manufactured in Europe, and some of the parts of the F-16s assembled in Europe will be manufactured in the United States.

Herbert F. Rogers, Fort Worth Division Deputy General Manager and F-16 Program Director who was in Europe for the milestone event at Fairey, said the division would receive wings from SABCA, center fuselages from Fairey and various other F-16 components and equipment from other firms in the four European participating countries.

After observing the fuselage milestone at Fairey, Arthur Talbott, the firm's President, said, "This F-16 Program milestone was made possible by the hard work, dedication and cooperation of many people on both sides of the Atlantic, representing government, the military and industry."



**Sections Joined.** Employees at Fairey S.A. begin joining the forward, center and aft fuselage sections of an F-16, marking the beginning of European F-16 assembly.

## Equal Opportunity at GD: Everyone's Chance to Grow

By G. Alexander Smith

After leaving her newly purchased home on the agricultural prairie of Southern Illinois, a 30-year-old woman heads to her job hundreds of feet underground at Freeman United's Orient No. 3.

A black engineering student puts aside his college books for a semester and begins helping with the design of test equipment for the F-16 at Fort Worth Division.

In the desolate desert valley at Fort Independence, Calif., a young Paiute Indian hurries to his new after-school job as an electronics assembler for a GD subcontractor.

Thousands of miles to the east, a disabled veteran, recently graduated from the Electric Boat apprentice program, shapes parts and components for nuclear submarines as a first class machinist.

"General Dynamics has always been a company that believes in providing equal opportunity to all people" says Louis M. Whitney, Corporate Manager-

Personnel and EEO Programs. "We have established programs which are designed to provide continuing equal treatment and opportunity to all, without regard to race, color, religion, sex, age or national origin. These programs are not superficial, they are meaningful and results oriented, and most important, they are working," states Whitney. "For example, last year the number of minorities and females in managerial positions increased by 26 percent and the number in professional jobs represented a net growth of 42 percent.

"That's progress and it's good business, to boot."

Maggie Irvin

Take the experience of Maggie Irvin, a laborer at Freeman United's Orient No. 3 underground coal mine, who says, "Mining has always been considered to be work for men, but times have changed. There is great opportunity for women in the mines."

(Continued on Page 4)

## Phalanx Production Under Way

The Phalanx radar controlled gun system for last-ditch ship defense against sea skimming missiles and aircraft is entering production at General Dynamics Pomona Division. Thirty-seven units will be produced under a \$100 million contract with the Naval Sea Systems Command.

It is the first non-missile related manufacturing contract in Pomona's history.

Shortly after the contract was signed, Rear Adm. E. W. Carter III, Deputy Commander for Weapons, Systems and Engineering, Naval Sea Systems Command, commented on the capability of Phalanx in a letter to Pomona Division General Manager Ralph E. Hawes, Jr. The letter said in part:

"When I survey the surface Navy - an intimate and integral part of my life

for many years-I appreciate the tremendous potential for this new weapon system which we have brought to life. Simply put, Phalanx can finally give the surface fleet a capability missing for decades-the capability to defend itself with high confidence against the worst that an adversary could direct against it."

The production program will employ in excess of 400 people, according to Walt Mastin, Phalanx Program Director.

Initial production activities for Phalanx began at Pomona last year under long-lead production contracts for tooling and test equipment.

Delivery of the initial Phalanx production units is scheduled to begin in early 1979. The Navy has said it may eventually acquire 446 Phalanx units for installation aboard its ships.



# Stromberg Phones Punished To Insure Long Service

By Bob Ford

A telephone crashes to a gleaming kitchen floor during a television commercial. The housewife picks up the phone and continues to talk while the camera lovingly admires the unmarked tile. The sponsor's floor wax gets glowing praise, but the trusty telephone goes unrewarded.

The telephone is one of the most indestructible of man's many complex tools, yet few appreciate its durability. A telephone is expected to work each and every time it is picked up, no matter how many times, year in and year out, over its 20-year or more life. And it rarely fails, even though there are some 266 parts inside a desk phone's molded plastic casing.

There is no planned obsolescence in the telephone industry. The instrument is designed and built to last, and life testing helps make sure that it does.

"We take telephones right off the assembly line and put them through all the punishment normally encountered in 20 years of the toughest business office use," says Roy Connors, quality assurance engineer at Stromberg-Carlson's telephone manufacturing plant in Charlottesville, Va.

"The tests are designed to verify the quality of production, even on phones that we've been manufacturing for years," he says, "and we also run life tests after each design change to make sure that the change will not affect quality."

Mr. Connors does not spend his days pushing telephones off tables. Life testing includes the detailed examination of all contact points for durability, but mostly it involves putting each moving part through the equivalent of 20 years of hard use.

## Navy Exercises Trident Option

The Navy has exercised its option with EB for two more Trident submarines. The option was for the sixth and seventh ships of the class.

The total cost of each Trident, including systems and equipment not supplied by EB, is estimated to be about \$1.2 billion. With the new award, EB has contracts for the construction of seven Tridents, the world's most powerful undersea craft.

With a surface displacement of 16,800 tons, Tridents are larger than some World War II-type cruisers. The 560-foot-long vessels are significantly larger, quieter and faster than the present Polaris and Poseidon missile-firing submarines.

Current Navy plans call for a fleet of 14 Tridents. Electric Boat has made significant progress on the construction of the Ohio, the first of the huge ships. The keel for the Michigan, the second ship, was laid in mid-1977 and components for three others are currently being fabricated at Groton and Quonset Point.

## GD Buys Texas Machining Facility

General Dynamics has purchased a heavy machining facility in Abilene, Tex. from Rockwell International.

The modern, 250,000-square-foot plant currently employs some 260 people.

Rockwell bought the plant in April 1977, and had intended to use it for producing parts for the now-cancelled B-1 bomber production program.

General Dynamics will use the facility to produce precision-machined parts for several of the company's divisions.

The facility's management, headed by Dale E. Miller, General Manager, was retained.

With the help of specially designed laboratory equipment, those 20 years are reduced to seven weeks for a rotary dial phone and only two and a half weeks for the Tone-Dial because of the push-button phone's faster operation.

To test a rotary dial, tireless mechanical fingers spin the dial from 0 and allow it to return a total of one million times in those seven weeks. With a circumference of nine inches, the dial travels 142 miles in its quest for breakdown before the engineers let it rest.

On another machine, Tone-Dial buttons are relentlessly punched 100,000 times each. Hook switches are depressed 150,000 times. Coil cords are stretched 250,000 times. The "key strip" buttons on multiline office phones are hammered down 300,000 times. And the ringer is operated continuously for a numbing 200 hours.

## Blizzards, Rain

# 'Old Man Winter' Plays Havoc at Divisions

*Editor's Note: The unpredictable weather since the beginning of the year has brought GD locations bone-numbing cold, blizzards, ice storms and torrential rains. "Every day is a new adventure," quipped a Stromberg-Carlson employee at Rochester, pondering on WINTER 1978.*

• *Rochester received 155 inches of snow as of March 14, compared with an average for an entire winter of 83 inches.*

• *San Diego, after suffering through a long drought last year, had over 16 inches of rain which caused flooding.*

• *Fort Worth employees slipped and skidded their way to work and back home in unaccustomed ice and slush.*

• *Quincy operations were shut down for 4 days because of a record 20-inch snowfall that paralyzed the Boston area.*

• *Electric Boat shut down in the middle of Storm Larry at noon on February 6th, and while thousands of yard workers struggled to get home through the blizzard, more than 200 were put up for the night in the administration building.*

*The weather affected GD employees in thousands of ways; here is the story of one experience:*

By Jack Isabel

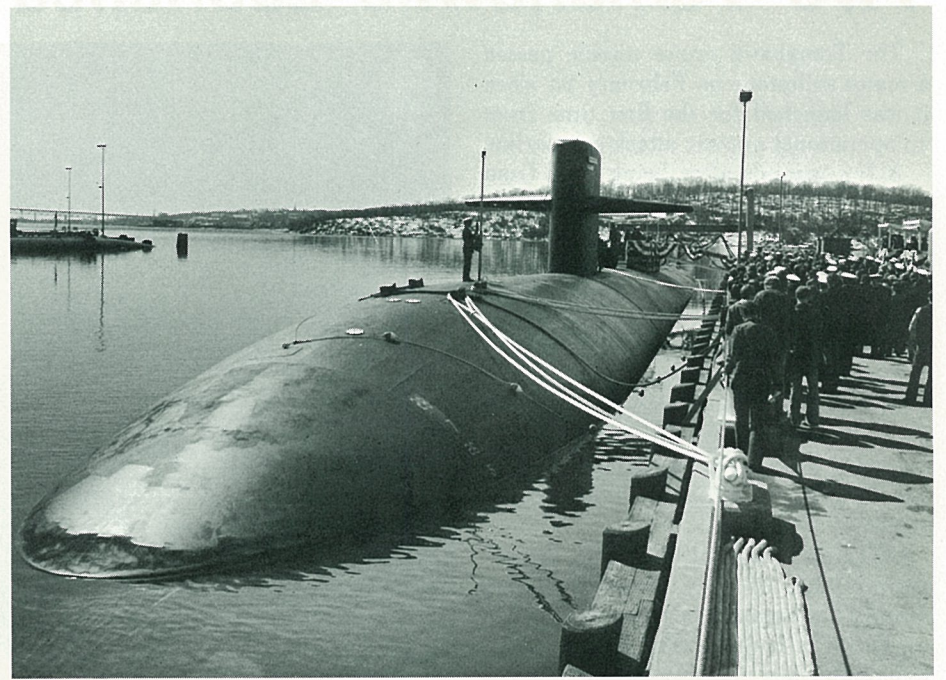
Bob Montague jumped from the frying pan right into the fire in February — or maybe it's more accurate to say that he left the murky floodwaters of the West Coast for the towering snow drifts of the East.

Mr. Montague, Convair's Supervisor of Motion Pictures and Television, left the torrential rains that wreaked havoc on Southern California and went on assignment to Electric Boat in Groton, Conn., where he got caught in one of the worst blizzards ever to blanket the East Coast.

EB's Gene Gardner, a technical writer, and Montague were in the last phases of putting together a video presentation for P. Takis Veliotis, EB's General Manager. On February 6th, the day Storm Larry hit, they started out from New London at 1 p.m. for Stratford, about 60 miles away, where they had planned to do the recording and final editing of the presentation.

"We made arrangements to go by bus, but the driver refused to leave the depot," Montague recalled later. Amtrak finally got them to Bridgeport about midnight, and from there they caught a commuter train to Stratford.

"There was no waiting room or depot," Montague said. "Just a platform and a field of white."



**Omaha Commissioned.** USS Omaha (SSN 692) was delivered March 11 during commissioning ceremonies at the Submarine Base in Groton. Omaha is the division's second 688-class sub and the 43rd nuclear submarine delivered by Electric Boat Division.

Toting their personal belongings and story boards, they trudged through waist-deep snow fighting the biting wind, to a tavern, a real haven at the time, according to Montague.

"Everything was at a virtual standstill, and we found out that our motel was still about six miles away," he said.

"One man with a front-wheel drive automobile offered to drive us to the motel for \$50 each. Another said he was going that way and would take us for free. We seized on that opportunity and loaded our gear in his trunk. But when it came time to leave, the car's battery was dead.

"A friend of our Samaritan attempted to get the car started, but the battery in his car went dead, too," Montague said.

Up drove the man with the \$50 offer — the offer still standing.

"As a last resort," Montague said, "we told him all the cash we had was \$43, and he would have to leave us \$3 for breakfast.

"He reluctantly agreed."

On the way, in near zero visibility, the car went into a snow drift. A four-wheel drive truck passed by, and the driver offered to pull us out, but our driver hooked the tow chain to his front-end in the wrong spot and the bumper wound up being pulled right from the car.

"Poetic justice," Montague asserts.

The weary twosome finally arrived at their motel at 2:30 a.m. — nearly 14 hours after they had started out.

## Funds Awarded for Flyoff Competition of Tomahawk

Convair has received a \$6.5 million letter contract for competitive development of the U.S. Air Force Air Launched Cruise Missile.

The Joint Cruise Missile Project Office issued the contract, the first funds for a flyoff program involving Convair's Tomahawk Air Launched Cruise Missile (AGM-109) and the Air Launched Cruise Missile (AGM-86) built by Boeing. Flight testing will be carried out at Edwards AFB, Calif., over the next two years.

Convair is establishing a small support function at Edwards for the competition.

Meanwhile, Defense Secretary Harold Brown emphasized the high national priority attached to the cruise missile program in the Defense Department's Annual Report.

"Since we must be certain of its success, I believe we must, as a matter of prudence, maintain both the Air Force air launched cruise missile (AGM-86) and the air launched version of the Navy Tomahawk cruise missile in full-scale development until a flyoff determines which missile can best be employed in the air launched mission," Dr. Brown stated.

"For the competitive flyoff, each contractor is scheduled to produce 14 test missiles leading to 10 flight tests in 1979. Our earlier flight tests and those conducted in the flyoff will ensure complete demonstration and evaluation of all risk areas so that we can make an air launched cruise missile selection in November 1979," the report continued.

In another posture statement by the military, Air Force General George S.

Brown, Chairman of the Joint Chiefs of Staff, had similar comments.

"The Air Force is currently planning a flyoff program to identify the best air launched cruise missile candidate for future deployment," he said. "This program is planned to support a limited operational capability in 1980 with an initial operational capability in 1981."

## Tomahawks . . .

(Continued from Page 1)

Two years ago, Tomahawk achieved its first underwater launch successes when two boost test vehicles were launched from an underwater torpedo tube off San Clemente Island. Since then, Tomahawk has clinched one milestone after another.

The recent flight tests were the 24th and 25th for Tomahawk missiles, which have recorded nearly 19 hours flying time. Tomahawks have been launched from beneath the surface five times, once from a ground platform and 19 times from under the wing of Navy aircraft.

The Submarine Launched Cruise Missile is currently in full-scale development at Convair. Development testing, which includes approximately 49 planned launches using both antiship and land-attack Tomahawks, is scheduled for completion in early 1980. The first launch from a surface ship is scheduled for later this year.

Others on hand to witness the recent tests were Guy W. Fiske, GD Executive Vice President, and Dr. Leonard F. Buchanan, Corporate Vice President and Convair General Manager.





**Convair Firefighter.** Gayle Brothers stands beside a Convair fire truck at the Lindbergh Field Plant. She has been with the company fire department two years and is the only woman assigned to the force as a firefighter.

## Gayle Brothers Switches From Horses to Fire Hoses

By Jack Isabel

The fire station at Convair's Lindbergh Field Plant is making a boast that the fire house at Kearny Mesa can't. They each have spanking new fire equipment and a capable cadre of industrial firefighters to man the units, but one of the firefighters at Lindbergh Field happens to be a woman.

Twenty-three-year-old Gayle Brothers has been on the job for nearly two years in a field heretofore held by the masculine set.

She heard about an opening in the division's fire department through a firefighter assigned to the Kearny Mesa facility.

"At the time," she says, "I was working horses part-time at a ranch and teaching youngsters to ride. Dave Watson, another GD firefighter, boarded his horse at the same ranch and told me of the opening on the fire force."

She applied, took the required physical and other tests and was hired.

Fire Chief Del Dimmitt says Miss Brothers has adjusted well to a firefighter's role in an industrial complex.

"It's a combination of fire science in-

telligence and physical stamina," he said.

She climbs ladders, rolls and lifts heavy hose, tests hose lines and hoists them onto a drying tower. As for maintaining her physical fitness, she lifts weights at home to strengthen her upper arms.

The job of an industrial firefighter is not one of repetition. The firefighters have to adjust to shift changes each month. Brothers works an eight-hour day and rotates days off with others in the department.

How does it feel to be the only woman in what used to be a man's world?

"I take some ribbing from the guys but I expected that," she says. She explained that she grew up with three brothers and learned to cope early.

Although she believes that rights of men and women should be equal in all phases, she is quick to point out that she does not reject courtesies.

"I enjoy the courtesies extended to me as a woman," she said. "But on the job, I recognize that those courtesies can't apply when we respond to an emergency situation — then I'm on my own."

## Convair Service Awards

### 40 Years

**Quality Assurance** — L. A. Bruger, G. M. Graham.

### 35 Years

**Finance** — N. N. Downs, H. H. Miller.

**Operations** — J. F. Montejano, J. G. Rogers, J. F. Young, L. Parsons, C. A. Banks, F. N. Shepard, R. G. Kinder, C. Mendoza Jr., R. E. Handley.

### Research and Engineering — G.

W. Bates, L. W. Munson.

### 30 Years

**Operations** — P. C. C. DeBaca, G. V. Ricks, E. B. Stevens, A. J. Braidic.

**Quality Assurance** — R. S. Sutton, R. L. Knapp.

**Contracts** — D. S. Lauder.

### 25 Years

**Research and Engineering** — W. W. Linder, J. E. Leib, E. J. Wehrhan, P. J. Stacey, K. Watkins, R. D. Small, R. D. Kesler.

**Operations** — R. G. Harter, W. L. Larson, L. H. Lesh, J. L. Albrecht, W. T. Hancock, C. A. Brack, H. B. Bishop, J. W. McMahon.

**Material** — M. M. Madrid, H. J. Lorenz Jr.

**Marketing** — S. T. Gmyr.

**Industrial Relations** — H. W. Gillespie.

## GD World

Published by General Dynamics Corporation, Pierre Laclède Center, St. Louis, Mo. 63105

G. Alexander Smith — Manager of internal communication

Fred Bettinger, Jack Isabel — Contributing editors, Convair Edition

## Atlas/Centaur Boosts Satellite For Military Communications

A Convair-built Atlas/Centaur rocket successfully launched the first spacecraft in an important new worldwide military communications system from Cape Canaveral, Fla., on February 9th.

Called Fleet Satellite Communication (FLTSATCOM), the satellite system will support vital communication needs of the U. S. Navy, Air Force, Department of Defense and the Presidential Command Network. Three more FLTSATCOMs will be launched later to complete the worldwide system.

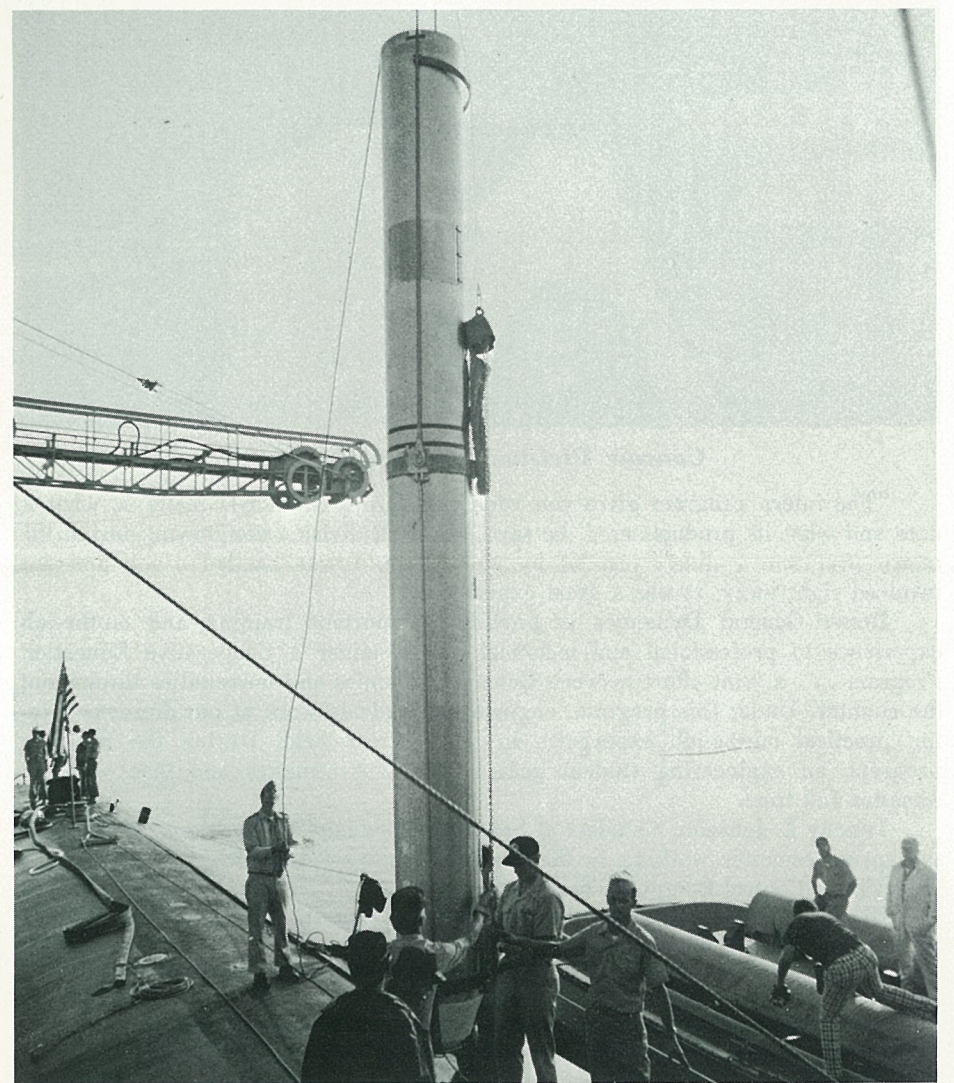
Following liftoff from Complex 36-A, all Atlas and Centaur systems functioned satisfactorily. The first burn of the Centaur engines injected the spacecraft into a parking orbit. After a coast period of about 15 minutes, Centaur's Pratt & Whitney RL-10 engines reignited to place the spacecraft in a highly elliptical, or egg-shaped, transfer orbit. As its final act, Centaur released the payload and backed off to take the booster safely out of the flight path of the satellite.

According to the National Aeronautics and Space Administration (NASA), at a weight of 4,132 pounds, the FLTSATCOM is the heaviest satellite launched into synchronous orbit by an Atlas/Centaur combination. Like all fully geosynchronous satellites, FLTSATCOM will appear to remain stationary in the sky while actually completing one orbit each day.

NASA said the Navy will use one fleet-broadcast and nine fleet-relay channels to provide communications between naval aircraft, ships, submarines and ground stations — both ship-to-ship and ship-to-shore.

The Air Force share of each FLTSATCOM will be 12 narrow band channels, NASA said. These will become part of the Air Force Satellite Communications System (AFSATCOM), which will include both FLTSATCOM and other spacecraft.

The Department of Defense has one channel reserved for its use.



**Loaded for Launch.** Crewmen and technicians load an encapsulated Tomahawk cruise missile onto USS Barb for the first firing of Tomahawk from an operational submarine. A Tomahawk was launched by the Barb off San Clemente Island in the Pacific and flew to Edwards AFB, Calif.

## Capt. Locke Picked For Flag Rank

Capt. Walter M. Locke, known to many members of the Tomahawk development team for his leadership of the Joint Cruise Missile Program Office, has been nominated for promotion to rear admiral.

A native of Berkeley, Calif., and a 30-year veteran of the U.S. Navy, Capt. Locke was one of 31 captains selected for promotion to flag rank.

He was graduated from the U.S. Naval Academy in 1952, and in the fol-

lowing year became a student aviator. Subsequently, he served as a flight officer, project test pilot, engineering division director and head of the missile guidance and control branch of the Naval Air Systems Command.

In 1972, he became program manager for the Navy Cruise Missile program, and, in 1976, was selected to head the joint development of the Tomahawk and the Boeing air-launched cruise missile programs.

## Disneyland Fun Day Planned for April 1st

General Dynamics night at Disneyland will be April 1st for all employees and their families.

Tickets at \$5.50 per person are still available on a first come, first served basis. They may be purchased at the CRA Clubhouse and outlets at Kearny Mesa and Lindbergh Field.

The single admission price for the 14th Annual Family Fun Party covers parking and unlimited use of the park's attractions except shooting galleries.

Gates will open exclusively for GD folk at 8:45 p.m., and the party will wind up at 1:45 a.m. No tickets will be sold at the Disneyland gates.

Special buses will run from the Kearny Mesa Plant to the Disneyland park. Round trip passes are \$6 per person. For those wishing to stay in the area overnight, a limited number of rooms are available at Ambassador Inns in Costa Mesa, Fullerton and Santa Ana.



**At GD****Equal Opportunity — A Chance to Grow***(Continued from Page 1)*

"I've been in the mine two years, but I'm only a rookie," Mrs. Irvin says. "I'm still learning every day."

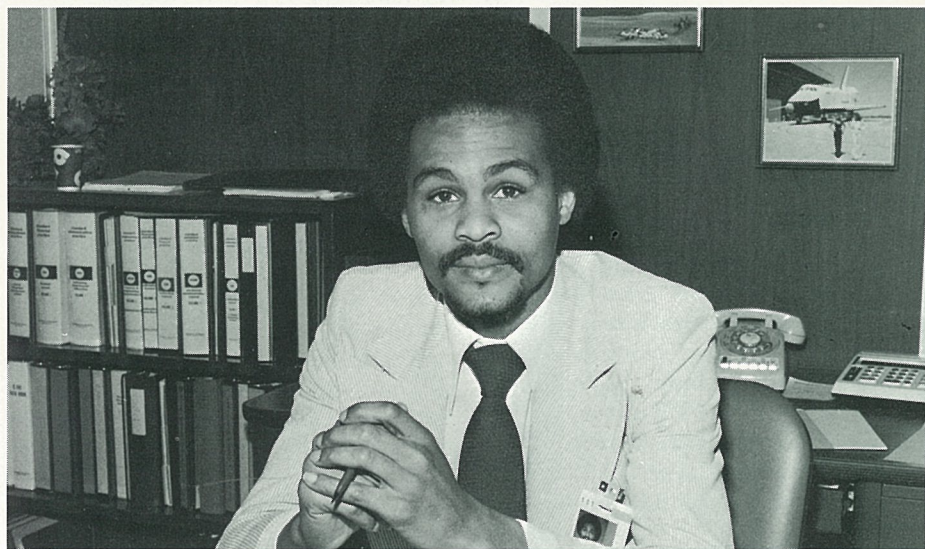
"When I get enough experience, I want to take some courses in mine technology and see about getting one of the boss jobs," she says.

"I've had more opportunities working there than I've ever had," she says.

Freeman was one of the first companies in the State of Illinois to hire women for underground coal mining jobs. Women are presently employed both in Freeman's underground and surface mines, in various classifications ranging from laborers to shuttle car operators and drivers of large haulage trucks.

Or take the case of the individuals with high potential that GD selects each year for its Management Intern Program. The program exposes the interns to a variety of jobs at different divisions over a 15-month period to develop their technical and managerial skills.

Myron Borders, a black graduate of Michigan State University with a bachelor's degree in mechanical engineering and of Washington University with a master's degree in business administration, is a good example. Mr. Borders was selected for General Dynamics Management Intern Program in September 1976, worked in four aerospace divisions and Corporate Headquarters and is now a Senior Estimator in the Program Development department at Convair.

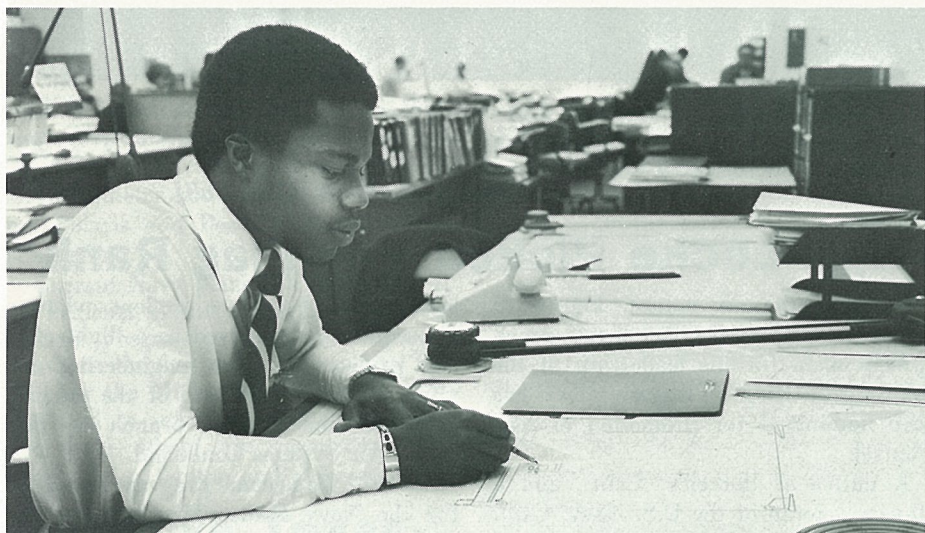
**Convair Division's Myron Borders**

"The intern program gives you wide exposure to what GD really is, what it does and what its products are," he says. "In each division assignment during the intern program, I didn't just sit by and watch, I was handed a job and got involved right away. It was a great experience."

**Item:** General Dynamics is providing important training and on-the-job experience to professional and technical people under a Cooperative Education Program . . . a joint effort between General Dynamics and universities throughout the country. Under this program, engineering students work at our divisions gaining practical on-the-job experience in their career field. During the five-year program, an engineering student goes to school a semester and then works a semester full time.

Tommy E. Johnson, a student at Southern University in Louisiana, is spending the spring semester working in the Electrical Support Equipment Group on the F-16 Flight Control Computer Test Station.

"This experience has provided me with the opportunity to become familiar with the real world of engineering," Mr. Johnson says. "I've gained pride in my profession and self confidence in my ability to perform the tasks at hand."

**Fort Worth's Tommy Johnson**

"By applying the theories that I have learned in school, my studies now seem to be more meaningful, and the money that I have earned through co-oping has helped me support my education."

**Item:** Special efforts are continuously being made to hire, train and promote Vietnam-era veterans and handicapped men and women.

Leon "Mike" Rambush, is another good example. Mr. Rambush was a sergeant in the U.S. Marine Corps and lost his right leg during the Tet Offensive in Vietnam in 1968.

He was hired by GD in 1973 and started his career as a third step learner in the Electric Boat machine shop. He signed up for the apprentice program, and after four years, he is a first-class machinist who can operate most of the tools in the machine shop.

"EB taught me a skill," he says. "I have a good job now, and I have a good future."

GD made an initial pledge to hire 1,000 Vietnam veterans and disabled veterans under the Help through Industry Retraining and Employment program in cooperation with the National Alliance of Businessmen and the Department of

**Electric Boat's Mike Rambush**

Labor. Recently, this pledge was increased to 2,850 and includes special training programs for almost 1,500 veterans.

**Item:** Career training and development are provided by divisions and subsidiaries both during inplant programs and through tuition assistance programs for college-level education.

GD encourages all of its employees to continue their college education, particularly in areas where the state of the art is changing rapidly. GD has a program to pay tuition costs for any employee who completes college level courses which are job related or lead to a degree in a field related to his or her occupation. In 1977 over a half million dollars was paid some 200 employees who took college-level courses to improve their education.

At Pomona, an extensive Career Development Program gives participants a wide perspective of the division's involvement in engineering and business activities and prepares them for additional responsibilities. Skill and technical training courses are offered, and last year alone, these courses had 1,158 students.

Fort Worth is involved in a 12-month electronic assembly training program for unskilled workers in the Dallas-Fort Worth area in conjunction with the federal Comprehensive Employment Training Act. The program is keyed to 120 projected openings in the division's electronic fabrication center.

**Material Service's Community Support**

Material Service Corporation actively supports the Chicago Area Youth Motivation Program which was organized by the Chicago Association of Commerce and Industry to encourage minority students to stay in school. MSC has taken on the responsibility of leading the program at the DuSable High School in Chicago's South Side.

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**Editor's Note — This article was written from material compiled by many sources throughout General Dynamics. Major inputs were provided by Public Affairs and Industrial Relations people located at the various divisions and subsidiaries of the corporation mentioned in the article.**

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Electronics Division has a career counseling program for minority high school students in which the variety of electronics careers is discussed, and students are given plant tours to let them learn more about the field.

Local programs and organizations across the country receive donations of equipment, parts and furniture from GD's operating units.

For example, Convair Division donated surplus resistors, capacitors, transistors and other electronic parts to the San Diego City School district to train handicapped and disabled students.

**Item:** GD recently pledged \$75,000 over a five-year period for the national Fund for Minority Engineering Students.

**Item:** GD purchasing agents across the corporation actively seek out minority-owned businesses in an unusual program to find potential suppliers to GD. The effort is aimed at expanding the number of qualified suppliers for GD and fostering these businesses. In 1977, GD purchased more than \$11 million from these firms, a five-fold increase over the \$1.8 million in 1975.

**Opportunities for American Indians**

**Item:** For more than 10 years GD has been working aggressively to bring employment opportunities to American Indians.

Since 1967, Pomona has leased a manufacturing facility from the Navajo Tribal Council at Fort Defiance, Ariz., and has been employing the Navajo to produce missile components. Employment is currently down somewhat from earlier high levels but, according to Whitney, the "facility is a highly efficient operation and we hope to continue to build our employment there in the future."

Last year, DatagraphiX channeled support to Wilder Enterprises, a tiny electronics firm founded by Kitty Wilder, a former DatagraphiX assembler, to provide jobs and training for Paiute Indians at Fort Independence, Calif.

"When my class went on a field trip to Mrs. Wilder's plant, I said to myself, 'I'd like to work here,'" says Ricky Miller, a Paiute Indian. He applied for a part-time job, and in addition to his school and basketball schedule after school, he is mastering the art of soldering, welding and assembling circuit breaker panels. His part-time job is allowing him to put aside money for college study in electronic engineering.

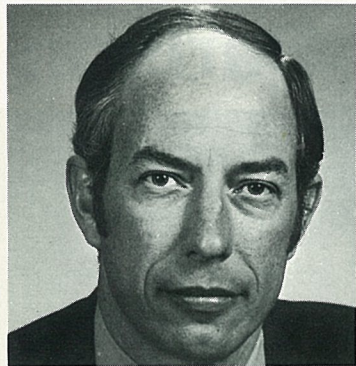
"It's rewarding to watch young people expand their horizons," Mrs. Wilder says.

"The personal horizons of the individuals mentioned above have been expanded by their experiences at General Dynamics — and that's important," Whitney said, "because GD's future depends on attracting capable personnel from all walks of life to apply their skills and unique talents to the corporation's programs."

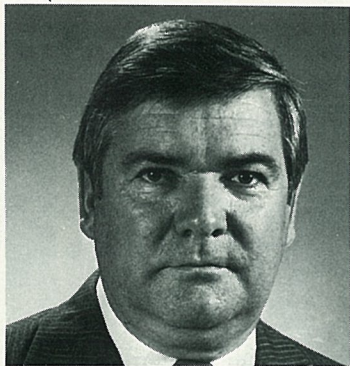
"We are doing a lot in all these areas, and we will do more in the future," he said. "A growing General Dynamics can provide the opportunity for individuals to grow."



# Promotions Announced for 5 Key Executives



**Hawes**



**Chopp**



**Hacker**



**Hall**



**Rambeau**

Major promotions for five key GD executives were announced earlier this month by David S. Lewis, Chair-

man and Chief Executive Officer. Ralph E. Hawes, Jr., General Manager of Pomona, was elected a Corpo-

rate Vice President by the Board of Directors, and George H. Chopp, Alan E. Hacker, Asaph H. Hall and Arch

H. Rambeau were named Staff Vice Presidents.

*Continued on Page 2*

## GD World

Vol. 8 No. 3

3

May 1978

### Inside the World

Jenny Named S-C President . . . . . Page 2

GD Plans ATC Acquisition . . . . . Page 4

## 47 Horsepower Moves 12,500-Ton Trident

*By Jim Reyburn*

Watching the recent unveiling of the *Ohio*, the U.S. Navy's first Trident missile firing submarine which is being built for the Navy at Electric Boat Division, was like watching the unbelievable unfold before your eyes.

Picture a giant 560-foot Jules Verne-like vessel, the largest submarine in the world, moving along over dry land, and you have some idea of the enormity of the spectacle.

In an operation more reminiscent of an airplane rollout than a submarine debut, *Ohio* — all 12,496 tons of her — was moved out of the covered assembly building at the Groton shipyard onto a concrete waterfront pier on the division's land level submarine construction facility where it will undergo final assembly and testing prior to launching early next year.

At 5:28 p.m. on April 21st, Douglas Brown, an EB carpenter, got the signal from Frank Tubeck, the yard's assistant superintendent — steel trades, to turn the master control switch, shooting 460 volts of electricity into the 93 electric motor driven transfer cars *Ohio* was riding on. The cars rolled on a grid track system.

If watching the event was impressive, learning the amount of horsepower used to move *Ohio* was almost mind-boggling: 46½. Each of the 93 transfer cars had a one-half horsepower electric drive motor. The secret was in the gear reduction in each motor — an amazing 5,247 to one (first gear in an automobile has a reduction of 30 to one). The lower the gear reduction, the greater the "pull force" of an engine and the more it can transport.

*Continued on Page 2*



Photo by Bill Brutzman

*The Ohio*

## Two-Seat F-16 Modified for 'Wild Weasel' Role

The U.S. Air Force uses the term "Wild Weasel" to describe aircraft specifically equipped to detect, locate and destroy enemy ground-based air defenses.

"GD-funded studies indicate that there will be a need for a superior defense suppression system to counter increasingly sophisticated and numerous ground-based enemy air defenses in the 1980s," says David J. Wheaton, Engineering Program Manager - F-16 Expanded Mission Applications at Fort Worth.

An F-16 Wild Weasel would be used to help defend friendly aircraft engaged in close air support or deep strike missions over enemy territory. Wild Weasel F-16s could operate on independent hunter-killer missions or in direct support of strike aircraft.

"The Air Force currently does not

have a requirement for Wild Weasel F-16s, but allied nations have expressed interest in the project," Mr. Wheaton says.

A Wild Weasel F-16 acquires data it needs through wing-tip antenna pods which provide unrestricted 360-degree coverage of radar-controlled threats.

Aboard the aircraft, an electronic warfare officer monitors the tactical situation, and special warnings are given for surface-to-air missile activity and launches.

In response, the Wild Weasel can fire antiradiation missiles, which home on the enemy radar site, or "smart" weapons such as the AGM-65 Maverick.

A less sophisticated version of the Wild Weasel F-16, also under consideration, would use the existing F-16 radar-warning receiver to cue defense suppression weapons.



**Wild Weasel.** GD is funding design work for converting the F-16 into a weapon for attacking ground-based air defense systems. The aircraft would use wing-tip antenna pods to detect emissions from hostile radars and anti-radiation air-to-ground missiles.

## U.S. Savings Bonds Are a Good Investment, Lewis Says

Why buy U.S. Savings Bonds?

General Dynamics Chairman David S. Lewis asked himself that question nearly 40 years ago when he was a fledgling engineer on his first job. He answered it recently at a meeting in St. Louis, kicking off the local Savings Bond drive and marking the beginning of the GD corporate campaign, which is being held from May 15th to May 26th.

"At first," recalled Mr. Lewis, "I supported Savings Bonds for both patriotic as well as practical reasons. It seemed the right thing to do for an employe of a major defense contractor."

Those are still good reasons, said Lewis, a member of the U.S. Industrial

Payroll Savings Committee. But they're not the only ones.

"Over the years, I've come to realize that Savings Bonds are a good investment," he said.

- They are easy to buy, and can be purchased through the GD payroll savings plan for as little as 50 cents a pay period.

- Bonds grow with the times. "When I bought my first bond in 1941, it paid 2.9% interest and matured in 10 years. Now, Savings Bonds earn 6% interest when held to maturity of five years. The routine savings discipline provided by payroll deductions generally works out to yield higher total savings for the in-

dividual than other savings institutions paying a slightly higher rate of interest," he said.

- Savings bonds are not subject to state or local taxes, and are subject to federal taxes only when cashed.

- Bonds continue to draw interest past maturity and can be easily converted to cash at any time.

"Since being appointed to the national Payroll Savings Committee, I've had the opportunity to learn the tremendous role that Savings Bonds play in the management of our national debt," said Lewis.

More than \$78 billion of the \$719 billion national debt is held by individuals in the form of Savings Bonds, he said.

This represents a noninflationary source of funds for government programs and helps keep the cost of government down.

Lewis noted that last year, 66% of General Dynamics' employees participated in the Savings Bond program. "This is a fine record, but we can do better." He pointed out that, nationally, Boeing, Lockheed, McDonnell Douglas and AT&T had employee participation of 99%, 98%, 89% and 83%, respectively.

"During our campaign this month, I hope that those who are not now participating in the program will join in and make U.S. Savings Bonds an important part of their personal financial planning," Lewis said.



## Five Key Executives Promoted

Continued from Page 1

Mr. Chopp was named Staff Vice President - Labor Relations; Mr. Hacker, formerly Controller of Convair, was named Staff Vice President - Financial Planning and Control; Mr. Hall was named Staff Vice President - Planning, and Mr. Rambeau was named Staff Vice President - Personnel Relations.

Hawes, a native of Covington, La., was graduated from Clarkson College of Technology, Potsdam, N.Y., with a Bachelor of Science Degree in Electrical Engineering in 1955. He later earned a master's degree in engineering from the University of California at Los Angeles. In 1956, he joined Pomona as an electronics engineer and has since held a number of important technical and managerial positions.

In announcing his election as Corporate Vice President, Mr. Lewis said, "Ralph Hawes has been a valued member of our engineering and management team since 1956, having progressed through various levels of increasing responsibility to the position of Vice President - Research and Engineering. In June, 1977, he was appointed General Manager of Pomona Division where the results of his enthusiasm, dedication and all-around professionalism are quite evident."

A native of Chicago, Chopp joined GD in 1966 as Manager of Wage and Labor Relations at Stromberg-Carlson. He was named Assistant Corporate Director of Labor Relations in 1970 and Corporate Director of Labor

Relations later that year. He holds a Bachelor of Science degree in Business Administration from the University of Notre Dame and was employed by General Motors and Westinghouse prior to joining GD.

Hacker, after joining Convair in 1962 as a planning engineer, later became a budget analyst in the corporate office. In 1973, he returned to Convair. He is a graduate of Northwestern University and holds a Bachelor of Science degree in Civil Engineering and a Master of Business Administration in Business Finance.

Hall joined GD in 1977 as Director of Planning, following a career with Westinghouse Electric and the U.S. Department of Transportation. He is a native of Elmira, N.Y., and holds both bachelors' and masters' degrees in industrial engineering and business administration from Dartmouth College.

Rambeau, a native of Borger, Tex., joined GD in San Diego as a manufacturing analyst in 1959 and served in a number of positions of increasing responsibility before being transferred to the Industrial Relations department of the corporate office in 1967. In 1969, he was named Director of Management Relations and Development and, in 1973, was promoted to Director of Personnel and Management Relations. He holds a Bachelor of Science degree in Industrial Management from San Diego State College.

## Jenny Named President Of Stromberg-Carlson

Frederick F. Jenny has been named President of Stromberg-Carlson Corp. He was formerly Vice President of Aerospace Operations for Control Data Corp.

Mr. Jenny succeeds Leonard A. Muller, who advised the company several months ago that he intended to resign in order to pursue other interests.

Mr. Muller joined Stromberg-Carlson in 1974 as President. During his tenure with the company, he was responsible for the development of Stromberg-Carlson's highly advanced System Century® family of computer-controlled digital telephone switching equipment and for the major reorganization and consolidation of the company's traditional product lines and facilities.

Jenny, 43, has been associated with Control Data since 1973, when he was appointed General Manager of that organization's Aerospace and Advanced Systems Operations. He was named Vice President of Aerospace Operations in 1974 with responsibility for the development of specialized processing systems



Frederick F. Jenny

for shipboard, ground based, airborne and spaceborne equipment.

A native of Milwaukee, Wis., Jenny received a Bachelor of Science degree in Electrical Engineering from Valparaiso University in 1956 and earned a master's degree in Electrical Engineering from Syracuse University in 1960.

**Around the World...  
...in GD**

**At CHQ:** George D. Van Huss Jr., joined as Corporate Marketing Manager - Europe (Bonn) . . . Louis A. Garrett was promoted to Corporate Marketing Manager - Canada and will be based in Ottawa . . . Evelyn L. Smith joined as Staff Accountant . . . Paul W. Maul joined as Corporate Manager, Omaha Field Office . . . Margaret K. Anderson was named Supervisor, Word Processing and Secretarial Services . . . Donald W. Thompson transferred from Fort Worth as Corporate Representative at Dayton . . . Richard V. Marlowe was promoted to Manager, Subcontract Audit . . . David M. Mattingly was promoted to Corporate Cash Planning Manager . . . Jerome R. Sonnabend and Robert W. Egel joined as Corporate Pilots . . . Edgar E. Lim joined as Corporate Tax Administrator . . . Dennis A. Denton joined as Senior Subcontract Auditor . . . Christopher W. Hansen was promoted to Corporate Manager, Legislative Analysis.

**At Convair:** Robert N. Casale joined as Marketing Manager . . . Donald L. Gillespie joined as Director - Marketing (International) . . . Nelson H. Ilgenfritz transferred from Pomona and was promoted to Engineering Manager . . . Edmund W. Milauckas and R. L. Johnson joined as Project Engineer - Senior . . . Edmund H. Conrow was promoted to Design Specialist . . . Weston W. Muse 3d was promoted to Chief - Plant Engineering.

**At Material Service:** Martin Norville was promoted to General Manager - Commercial Aggregate Sales . . . Arthur J. Littva was promoted to Manager of Pipe Plants.

**At Pomona:** Cleveland Holifield and Moya J. Wicks joined as Quality Assurance Specialist - Senior . . . Roger E. Favreau was promoted to Manager - Procurement . . . D. A. Lasby has been appointed Field Office Manager of the Rockaway office . . . Wayne A. Hall was promoted to Section Head . . . Robert M. Cohen, David E. Gibbs, Donald S. Hollenbeck, Robert E. White, and Etric L. Stone were promoted to Project Engineer . . . James C. Hansen Jr., was promoted to Assistant Program Director - DIVAD Administration . . . Thomas V. Lewis was promoted to Assistant Program Director . . . Gregory Lysecky and Gail R. Mulholland were advanced to Group Engineer . . . William S. Drum joined as Manufacturing Development Specialist - Senior . . . Harold S. Gault was promoted to Director of Estimating . . . Joe H. Hahn was promoted to Manager Procurement Quality Assurance . . . George A. Matsumoto joined as Design Specialist . . . J. Dent Eiland was named Corporate Director - Special Government Accounting Activities.

**At Quincy:** William J. Bieryla was promoted to Director of Industrial Relations . . . Thomas S. Cowan Jr., was promoted to Director of Operations.

**At Fort Worth:** Alan B. Adler joined as Engineering Chief . . . John S. Robinson was promoted to Group Engineer . . . Edward M. Petrushka was named Manager of Advanced Navy Aircraft . . . Larry R. Kissinger joined as Flight Captain . . . John C. Ruth joined as Project Engineer . . . Michael W. Wynne was promoted to Contract & Cost Research Specialist.

**At Electronics:** Harold H. Tracy Jr., was promoted to Engineering Manager - Range Systems . . . John D. Kiefner was promoted to Manager of Manufacturing . . . Lawrence M. Palmer was promoted to Manager of Microelectronics . . . Mort Kantor transferred from Convair as Manager and Cost Proposal Leader for the SOTAS EDM proposal . . . C. Robert Stoker has been appointed Controller.

**At Stromberg-Carlson:** Richard R. Dever was promoted to Technical Staff Engineer . . . John W. Woodward advanced to Manager - Software Development - DBX . . . Gilbert P. Roberts was promoted to Manager - Production, Charlottesville . . . Patricia Lewis transferred from St. Louis and was promoted to Manager of News and Information at Tampa.

**At Asbestos:** Jean Gaudry joined as Sales Director & Director of Marketing . . . Thorwald F. Nilsen was named Sales Director.

## Lewis Tells Shareholders '77 Was Another Fine Year

"1977 was another fine operating year for General Dynamics," said David S. Lewis, GD's Chairman and Chief Executive Officer, at the annual meeting May 4th in St. Louis.

After noting that 1977 marked the seventh consecutive year "for steady and solid growth in every important financial category," Mr. Lewis told the shareholders at the meeting, "It is important to note that the same time this seven-year record of financial growth was being established, the corporation was involved in a massive capital improvement program to modernize its facilities and to prepare for the tremendous backlog of business that was developing.

"Nearly \$700 million has been expended since 1971 for new or improved facilities at our various divisions and subsidiaries and an additional invest-

ment of \$190 million is planned for 1978."

During the meeting, shareholders elected Elliot H. Stein, president of a St. Louis investment brokerage firm, as a new member of the Board of Directors.

During the first quarter of 1978, GD earned \$19.8 million, or \$1.86 per share, compared with \$18.9 million, or \$1.73 per share, for the first quarter of 1977. Sales for the first period of this year amounted to \$682.1 million, compared with sales of \$678.4 million for the comparable period of 1977.

"This fine record, both in 1978 and over the past several years, is unquestionably due to the outstanding efforts and innovative spirit of our 73,000 dedicated employees," Lewis said.

"Their skills have brought us to where we are today."

## Terhune to Aid Commercial Growth

J. Michael Terhune, 34, has been named Corporate Director, Commercial Business Development, at Corporate headquarters.

In this new position, Mr. Terhune will be responsible for assisting in expanding the company's commercial business

through strategic planning and allocation of resources between internal growth, acquisition or mergers.

Terhune joins General Dynamics from Northern Telecom, where he was President of that company's Advanced Telephone Products Division.

## 47 Horses Move Trident Sub

Continued from Page 1

In a chilling southwest wind off the Thames River, Ohio began a broadside crawl to port on the first leg of her 532-foot trip.

"I don't think I'd be able to believe this if I wasn't standing here actually watching it," someone said.

Twenty-three minutes later, Mr. Brown turned the control switch off, stopping the cars. Ohio had moved 51 feet south and was in position for the second section of the journey - 430 feet out onto the platform to the west.

Carpenters immediately went to work placing wedges under the ends of the 31 strongbacks the sub was resting on to prepare for turning the transfer cars

90 degrees to line up on the tracks for the second straight-ahead leg.

Over the next two hours, the cars were raised on their hydraulic jacks and turned. Wheel and track alignment were checked. The cars were then lowered onto the tracks and the ship's weight was shifted off the strongbacks and back onto the cars.

At 11 p.m. Ohio's massive rudder assembly cleared the building, and, 20 minutes later the cars were stopped for raising and turning the transfer cars.

Ohio was off again at 1:40 a.m., and she came to rest at 2:07 a.m. in a pre-launch position on the platform just north of the huge pontoon graving dock.





**Excel Award.** Dr. L. F. Buchanan (right) GD Vice President and Convair General Manager, presents the Excel Award to Financial Analyst Don Van Epps.

## Van Epps Wins Excel Award

Financial Analyst Don Van Epps has been named winner of the Convair General Manager's Excel Award for 1977.

The award is the highest honor in the division's Excel motivation program for personal excellence.

A. E. Hacker, former Convair Controller and now GD's Staff Vice President - Financial Planning and Control, says Mr. Van Epps is "Convair's authority on factory performance status reporting."

Mr. Hacker said Van Epps was chosen for the award because of his thorough knowledge of Convair manufacturing and industrial management systems, his keen analytical ability, and his extensive experience in industrial engineering, operation forecasting and production control.

"His personal contributions to any number of programs and the upgraded reporting which he has installed have

had a more than favorable impact on production management at Convair," Hacker said.

Van Epps participated in leading a committee for a production engineering task review, reprogramming factory performance reporting, and devising a system for separating surplus DC-10 parts costs.

He spent a major portion of 1977 overhauling, renewing and reprogramming (with Western Data Systems Center) the financial system for intercontract transfer.

"It is one of the most extensive reprogramming tasks that labor accounting has attempted," Hacker said. "Under Don Van Epps' direction it has progressed to 90 percent completion."

Dr. L. F. Buchanan, Convair General Manager, presented Van Epps with the Excel Award plaque and a \$200 U.S. Savings Bond.

## Atlas-Centaur Launches Final Intelsat IV-A Satellite

A powerful Atlas-Centaur rocket has successfully launched the sixth Intelsat IV-A commercial communications satellite from the John F. Kennedy Space Center in Florida.

The flawless blastoff of Atlas-Centaur, which occurred March 31st, was the last in a series of Intelsat IV-A satellite launches.

Service for the International Telecommunications Satellite Organization (INTELSAT) will shift to the more powerful Intelsat V spacecraft in the future. These new communications satellites will have approximately three times the transmitting capacity of the Intersat IV-As. The Convair Atlas-Centaur combination will launch four of the new satellites during 1979-1980.

During the recent Intelsat IV-A launch, all systems functioned normally as the Atlas-Centaur placed the satellite in a highly elliptical orbit of 341 miles by 32,240 miles. After reorientation of the satellite, a solid propellant rocket motor aboard the spacecraft was fired to establish a circular orbit at 22,240 miles over the Equator. Because of the speed of the spacecraft in orbit, it remains in position over one spot on the earth's surface.

The 3-263-pound communications satellite will provide international communications service to about 40 countries in the Indian Ocean area. It has the capacity to relay more than 6,000 simultaneous telephone calls and two television programs.

## Convair Service Awards

### 35 Years

**Operations:** C. E. Bolander, D. Cervantes, G. T. Adams, J. A. Harris, M. H. Button.

**Research and Engineering:** J. C. Sproat, C. F. Gonzales, E. A. DiGiulio.

**Finance:** M. R. Hardy.

### 30 Years

**Operations:** R. N. Hanby, R. D. Nowka, P. W. Byrd, L. G. Prine, A. R. Lassen, W. H. Brown, H. W. Jackson.

**Research and Engineering:** R. S. Hyatt, H. E. Buehner, R. A. Frey.

**Finance:** A. E. O'Brien, C. E. Quinton.

**Quality Assurance:** W. L. Colahan.

### 25 Years

**Operations:** J. W. Clark, H. F. Davis, H. R. Smith, A. W. Matthews, L. D. Gaines, J. A. Dunleavy, D. L. Smock, R. L. Costan, R. R. Mendiola, L. J. Nemshack, D. C. Taylor, K. E. Bennett, L. B. Richards, E. N. Clifton, J. Stanger, D. G. Gordon, E. A. Rueterholtz, R. A. Gadow, T. C. Mitchell, Jr.

**Quality Assurance:** W. E. Dudley, L. E. Johnson, A. L. Rader.

**Finance:** A. S. Donnelly, H. G. Cooper, O. J. Ohlsson.

**Research and Engineering:** J. L. Lull, A. R. Couillard, M. K. Spencer.

**Material:** F. L. Pike Jr., A. L. Borer, V. C. Holt Jr., R. Horn.

## GD World

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Fred Bettinger, Jack Isabel — Contributing editors, Convair Edition

## Schwab Named V. P. Tomahawk Marketing

Paul E. Schwab has been named Vice President - Tomahawk Marketing for Convair.

He will be responsible for marketing all variants of the Tomahawk cruise missile. Convair is developing submarine-launched and ship-launched Tomahawks for the U.S. Navy and a ground-launched Tomahawk for the U.S. Air Force. It is also competing for the Air Force's air-launched cruise missile contract.

Since 1976, Mr. Schwab has been Vice President of Marketing for Electronics Division and was responsible for domestic and international marketing,

customer relations and marketing long range planning.

He joined GD in 1952 at Pomona where he served in a variety of contracts and planning positions. In 1961, he was transferred to the Washington office, and was Director of Marine and Tactical Missile Systems there when he was named Director of Marketing for the Electronics Division in 1974.

Schwab received his bachelor's degree in economics from Pomona College and holds a master's degree in business administration from Stanford University.



**Orbiter at Marshall.** The Space Shuttle Orbiter Enterprise is transported overland past the National Aeronautics and Space Administration's George C. Marshall Space Flight Center headquarters complex. The Enterprise is scheduled to undergo a series of ground vibration tests at Marshall. The Orbiter made its cross-country trip from California to Alabama atop its Boeing 747 carrier aircraft. Convair built the midfuselage section of the Orbiter.

## Two Earn Suggestion Citations

Fort Worth's Bessie O'Flaherty and Kenneth Stewart earned citations from the National Association of Suggestion Systems for their outstanding suggestions during 1977.

Mrs. O'Flaherty suggested use of spring-loaded elastic lined clamps instead of Velcro tape to hold bundles of wire in place during assembly of electrical harnesses. The first-year savings were \$29,412, which earned her an award of \$1,426.48.

Mr. Stewart suggested deletion of a shot peening operation and use of a cheaper finish coating on titanium fittings for hydraulic tubing. He received the maximum award of \$5,000; the first-year savings amounted to \$218,891.



**O'Flaherty**



**Stewart**

During 1977, 648 employees earned \$70,931 in awards for suggestions that saved a total of \$1,315,945 at Fort Worth.



**Con-Trib Honor.** Representatives of the Con-Trib Club receive an Honor Award and congratulations from R. R. Richardson (left) Vice Chairman of United Way/CHAD Combined Campaign, and John Riley, second from left, Chairman of the Large Employers Division. Accepting the award is Mrs. Roy Johnson. Others, from right: Jack Martin, Betty Taylor, Art Medrano, Carol Parkhurst, Roy Johnson and Ray Mendoza, Chairman of the Employee's Con-Trib Club. Convair employees pledged \$327,500 in the 1977 campaign.



# GD Plans to Acquire Telecommunications Corporation

In its first acquisition move since 1974, GD has announced plans to acquire American Telecommunications Corp. (ATC), a California-based equipment manufacturer.

ATC, which has annual sales of about \$38 million, manufactures decorator and character telephones, automatic dialers, answering machines and central telephone office equipment and digital branch exchanges called FOCUS®. The exchanges are currently sold by General Dynamics Communications Co. for 400-line and smaller installations. FOCUS equipment is the most advanced and competitive available in its line sizes.

Last year, ATC sold over 100,000 of The Mickey Mouse Phones™, and, in April unveiled The SNOOPY & WOODSTOCK Phones patterned on the famous comic strip character.

Discussing the reasons for the proposed acquisition, Guy W. Fiske, GD's Executive Vice President - Commercial, said:

"We need to expand our effort in the telecommunications industry for several reasons. One of the most important is that this field offers one of the highest growth potentials of any business today. Changing technology using minicomputers and microprocessors in telephone systems is part of the reason for the rapid growth potential, but so is the increasing demand for telephone service in the developing nations and in the Middle East.

"This potential for new business has



PEANUTS Characters: © 1958, 1965 United Feature Syndicate, Inc.  
**The SNOOPY & WOODSTOCK Phone**

brought about a sharp increase in competition with computer-oriented companies entering the telecommunications

field that was once considered staid," he continued.

"If we are to be successful in the tele-

communications field, then we must have a much larger base than we now have."

ATC and GD have signed a letter of intent covering the proposed acquisition, according to a joint statement by GD's Chairman and Chief Executive Officer David S. Lewis and Henry Marcheschi, Chairman and President of ATC.

The acquisition is subject to a number of conditions and the approval of ATC's shareholders.

Mr. Fiske said ATC would be operated as a separate business under its current management when the acquisition is completed.

GD presently has two subsidiaries in the telecommunications field: Stromberg-Carlson, manufacturer of telephone switching equipment and standard telephones, and General Dynamics Communications Company which installs and services telephone switching equipment for business and private industry.

Stromberg-Carlson handles large volume switching equipment for the independent telephone industry. ATC manufactures FOCUS in a joint venture with Fujitsu Ltd. of Japan.

"American Telecommunications, though only 11 years old, is firmly established in a number of markets and products where Stromberg-Carlson is not represented," Fiske said.

"The two companies give GD a wider range of telecommunications equipment, and they will expand our commitment to the telephone industry."

## Protecting Your Health Is Their Only Business

Noise, dust, fumes, heat and radiation can all affect the health of employees at manufacturing facilities. To protect the well-being of GD employees, their working environment is regularly monitored, and, where problems are found, corrective action is taken.

Monitoring activities are conducted by local plant health specialists who receive technical backup from the Bioenvironmental Health Center at Fort Worth Division. With a staff of four industrial hygienists, the center tests samples from GD facilities across the country, collects the latest information on occupational health and trains local industrial hygiene personnel.

"The center has the latest available technical information on occupational health and performs laboratory tests on samples and equipment from GD's facilities," says Frank L. Paschal, the center's administrator.

"Our work never stops, because as GD introduces new manufacturing processes to build even more sophisticated products, the impact of those innovations has to be evaluated from the standpoint of an employee's health."

For example, Mr. Paschal says, a new automatic riveting machine may speed up work and cut production costs, but, under the corporation's strict health standards, it must be tested to insure that it does not impair the hearing of the operator.

"If our tests prove the machine may be harmful, the center looks for ways to reduce the noise by re-engineering the machine, or prescribes the use of ear protectors for the operator."

## Savings And Stock Values

The GD Savings and Stock Investment Plan unit values for the month of February 1978 were:

<b>Salaried:</b>	
Government Bonds	\$1.9694
Diversified Portfolio	\$1.1472
<b>Hourly:</b>	
Government Bonds	\$1.9669
Diversified Portfolio	\$1.1733
General Dynamics Stock	\$39.25



**Air Sampler.** Barb Kuhn, an industrial hygienist for the Bioenvironmental Health Center, uses an air sampling device to test the work area of David E. Britton, a Fort Worth process equipment operator. Air samples collected at GD's manufacturing facilities are analyzed to assure the air is safe for GD employees.

The center dates from 1969 when a growing awareness of the potential hazards associated with exposure to toxic substances and harmful physical agents led to the formation of a central company-sponsored laboratory to provide technical support to GD's occupational health programs.

The Center was founded before the Occupational Safety and Health Act of 1970 was passed and is one of only about 100 industrial laboratories accredited by the American Industrial Hygiene Association. The association promotes the study and control of environmental stresses which affect the health of industrial employees or the public.

One of the first tasks of the center was to make a detailed survey of GD's divisions to identify occupational and environmental health hazards and to prescribe corrective action.

Since that time, the center has assisted occupational health specialists throughout the company by supplying technical information, lending sampling equipment and conducting tests. Plants and locations which are too small to have a

full-time industrial hygienist on the staff rely on the center for direct support.

"Each of our facilities conducts a comprehensive personnel protection program, which is monitored closely by the corporate staff, to assure adequacy of coverage and adoption of the most advanced developments in the field," says David R. Lavalette, Corporate Manager of Safety and Health.

## Safety Records Are Recognized

Convair, Electronics, Fort Worth and Datagraphix compiled safety records during 1977 which were substantially better than the averages for their own industries. They also conducted safety programs which met or exceeded GD's corporate standards, according to David R. Lavalette, Corporate Manager of Safety and Health. Their efforts in the area of safety earned them the Chairman's Award for Excellence in Safety Performance for the year 1977.

In addition, Charleston facility, Electro Dynamic, Marblehead Lime, Po-

mona, Quincy and Stromberg-Carlson compiled records for safety which were better than the average in their respective industries, Mr. Lavalette said.

Quonset Point Facility achieved the greatest improvement in safety performance in 1977 compared with the prior year, reducing lost workday and recordable injury incidence rate to 50% of the prior year's results.

The corporate-wide lost workday rate was 10% below comparable national averages, and the corporation's recordable injury incidence rate was 20% below national averages.

"The center provides the technical support for these efforts and has assisted immeasurably in the creation of highly qualified occupational and environmental health efforts at many of our locations," Lavalette says.

"As GD moves into new areas of technology, the center will continue to play an important role in assuring the protection of our employees and the communities where GD is located."



# GD, Navy Reach Agreement on Submarine Contracts

**Editor's Note:** On Friday, June 9, 1978, General Dynamics and the U.S. Navy reached a settlement of the long-standing controversy concerning the responsibility for cost overruns on two contracts the company holds for construction of 18 SSN 688-class submarines at Electric Boat. Because of the importance of this settlement to employees across the corporation, GD World is publishing the entire text of a letter on the settlement that David S. Lewis, Chairman and Chief Executive Officer, sent to the shareholders on June 14th.

To Our Shareholders:

On June 9, 1978, an announcement was made that a settlement agreement had been reached with regard to the long-standing dispute between the Navy and General Dynamics concerning the responsibility for the large cost overruns on the two construction contracts for 18 SSN 688 submarines. This agreement, when it becomes final, will provide an end to a major financial problem that has been hanging over the company for the past three years and an end to a controversy that has inhibited the actions of General Dynamics in many ways. While the press notices released by the Navy and the company fairly summarized the key points of the agreement, this letter is being written to insure that all shareholders fully understand its substance.

As was indicated in the company's 1977 Annual Report, the cost to complete the two submarine construction contracts was estimated to be approximately \$843 million more than would be received from the current contracts. This estimate was made assuming an inflation rate of 7% per year for labor and 6% per year for material in each of the next six years, the approximate time required to build the remaining submarines.

Under the terms of the settlement agreed to with the Navy, the \$843 million overrun will be covered by:

- (a) A \$125 million contract price increase to cover existing company claims against the Navy. This leaves \$718 million.
- (b) \$359 million, one half of the remaining costs, will be paid by the Navy.

- (c) \$359 million, one half of remaining costs, will be absorbed as a "fixed loss" by General Dynamics over the remaining submarine construction period.
- (d) Possible further cost overruns will be divided 50-50 up to a total of \$100 million with costs above that figure being the total responsibility of General Dynamics.
- (e) The Navy will pay for all costs due to inflation above a 7%/6% annual rate — without limit.
- (f) The Navy will make a cash payment of \$300 million to General Dynamics to reimburse the company for part of the approximately \$345 million in "unreimbursed expenditures" which the company has been financing for many months. The remaining \$45 million of "unreimbursed expenditures" will be applied against the company's \$359 million loss commitment. The balance of the "fixed loss" obligation of approximately \$314 million will be satisfied through reductions in future monthly billings for work done on the ships over the remaining 6-year construction period.

Under the accounting policies followed by General Dynamics, a loss must be taken in full when the existence of the loss is known — even though most of the loss will actually be incurred over several years in the future. Accordingly, we expect to reflect the fixed loss of \$359 million (\$187 million after taxes) immediately after the settlement becomes final, which can only be after certain Committees of the Congress have had 60 legislative days to consider the agreement.

\* \* \*

The two SSN 688 contracts were awarded to Electric Boat in 1971 and 1973. Since that time the Navy, through its design agent, has furnished initial drawings and other data that have been significantly late and defective and has directed thousands of changes and modifications to the engineering drawings to the extent that there has been an unprecedented amount of rework and delay

*Continued on Page 2*

## GD World

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July 1978

### Inside the World

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## Tomahawk Demonstrated to Newsmen at White Sands

In its first public flight, a Convair-built Tomahawk cruise missile carried out a two-hour demonstration for more than 50 newsmen on June 21st over White Sands Missile Range in New Mexico.

Secretary of Defense Harold Brown told newsmen present that the development of cruise missiles is on schedule and predicted that they will be able to penetrate any defense system when they are deployed in the early 1980s.

Mr. Brown also said the government's decision to implement full development of cruise missiles rather than the B-1 bomber has "in my view been completely vindicated."

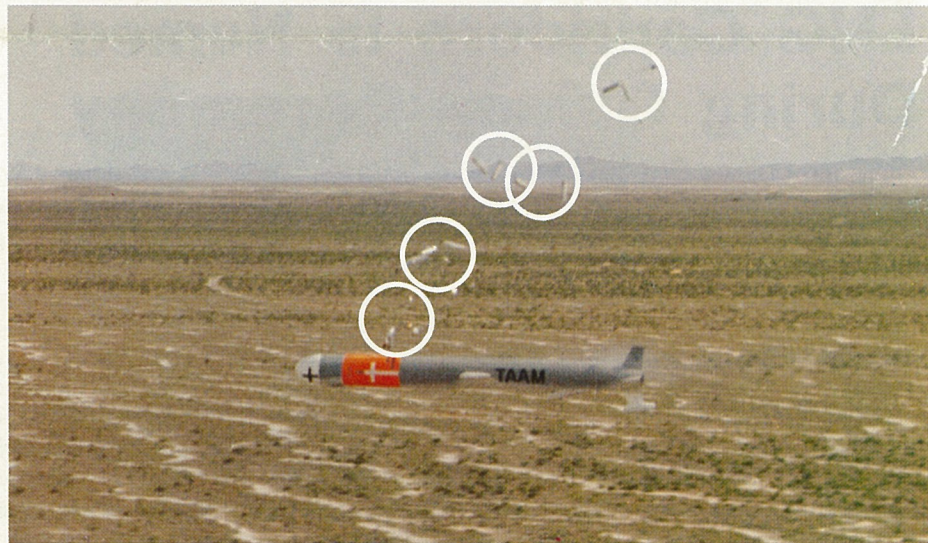
The 2,650-pound Tomahawk was launched from a U.S. Navy A-6 Intruder over the missile range and flew 100 feet above the desert floor at speeds up to

500 miles per hour. Using a preprogrammed "map" of the terrain in its computerized guidance system, the Tomahawk swirled around a test course 100 miles long and 40 miles wide.

Brown flew by helicopter to a number of sites around the range where Navy and U.S. Army officials collected data designed to determine under what conditions, if any, a cruise missile is susceptible to detection by enemy defense systems.

The missile made six passes against the defense radars before activating its recovery system and floating to earth under a huge parachute.

Brown told the reporters that the current series of survivability tests "confirms to us that the U. S. strategic cruise missile will be able to penetrate" enemy defenses.



**On Target.** A Tomahawk Airfield Attack Missile dispenses submunitions (circles) as it flies over its target at Dugway Proving Ground, Utah, after a test flight from Nellis AFB, Nev., on May 26th.

## J. H. Lennox Named Quincy General Manager

Joseph H. Lennox has been named General Manager of Quincy Shipbuilding Division, according to David S. Lewis, Chairman and Chief Executive Officer.

Mr. Lennox, who has more than 21 years of shipbuilding experience, joined General Dynamics at Quincy in 1973. He most recently served as Assistant General Manager with primary responsibility for construction of the liquefied natural gas (LNG) tankers being built at Quincy.

A native of Belfast, Northern Ireland, Lennox attended the College of Technology, Queen's University, there. In 1957 he joined Davie Shipbuilding Ltd., Quebec, Canada, where he held a number of increasingly important management positions including that of General Superintendent.

Peter J. Gwyn, who has been Acting General Manager of the Quincy Division since October 1977, has been named General Manager of the division's Charleston, S.C., facility. He will be responsible for construction of the 120-foot-diameter spherical aluminum cargo

tanks for the LNG ships and for development of additional major business for the facility.

A native of Kingsheath, England, Mr. Gwyn attended the Royal Military College, St. Jean, Quebec; the Royal Naval College, Greenwich, England, and the Quebec School of Naval Architecture. From 1953 to 1961 he served in the Royal Canadian Navy rising to the rank of Lieutenant and, in 1961, he joined Davie Shipbuilding Ltd., Quebec, Canada. He was Assistant General Manager there when he joined General Dynamics at Quincy in 1973, and, from 1973 to late 1977, his position was Assistant General Manager at Quincy.

Constantin Hatzis, who has been General Manager of the Charleston facility since October 1977, will return to Quincy with major responsibilities in the LNG ship construction program.

During the past year, the Quincy Shipbuilding Division has delivered three of the huge 125,000-cubic-meter liquefied natural gas tankers and holds contracts for seven more.



**Sister Ships.** LNG Capricorn (rear), the third liquefied natural gas tanker completed by Quincy Shipbuilding, heads for sea trials in early June, past a tanker being outfitted. (See related story Page 2)



## Frank O. Chesus Appointed Electronics General Manager

Four GD executives will take on new assignments at Electronics Division, according to David S. Lewis, Chairman and Chief Executive Officer.

Frank O. Chesus has been named Division Vice President and General Manager; Kenneth S. Lake will be Division Vice President - Operations; Joseph F. Muse Jr. has been named Division Vice President - Marketing, and Herbert E. Jordan will be Division Vice President - F-16 Avionics Intermediate Shop Program.

Mr. Lewis said the appointments of these very experienced executives will greatly strengthen the division as it moves into a number of major production and development programs.

Mr. Chesus, who has been with General Dynamics since 1956 and most recently served as Vice President - Operations at Pomona, succeeds Frederick H. Krantz, who will now be working on a special assignment reporting to James M. Beggs, Executive Vice President - Aerospace.

A native of Gillespie, Ill., Chesus attended the University of California at Riverside and has taken engineering management courses at Claremont University, Claremont, Calif.

While at Pomona, Chesus held a number of increasingly important engineering and management positions, including: Standard Missile Program Director; Director of Advanced Programs; Sparrow Missile Program Director, and Vice President - Operations.

Mr. Lake has been Director of Manufacturing at Pomona since 1976. In his new assignment at Electronics, he will

be responsible for all manufacturing operations.

A native of Toronto, Canada, Lake attended the University of California at Riverside and was graduated from Pepperdine University in 1975 with a bachelor's degree in administrative sciences. He joined General Dynamics in 1966 and has held a variety of manufacturing positions since.

Mr. Muse has been Marketing Director at Pomona since 1976, responsible primarily for Navy programs. In his new assignment at Electronics, he will be responsible for coordinating and directing the marketing efforts of the division.

A native of New York City, Muse was graduated from Brown University in 1956 with a bachelor's degree in mechanical engineering and earned a master's degree in engineering administration from George Washington University in 1959. He joined General Dynamics at Pomona in 1959 and has held a number of engineering and marketing positions since.

Mr. Jordan has been an Engineering Program Manager on electronic systems at Fort Worth since 1975. In his new position at Electronics, he will be responsible for the development and production of the F-16 Avionics Intermediate Shop.

A native of Covina, Calif., Jordan attended the University of California at Los Angeles and Glendale College, Glendale, Calif. He joined General Dynamics in 1956 and has held a number of engineering, design and program management positions at the Pomona and Fort Worth divisions.

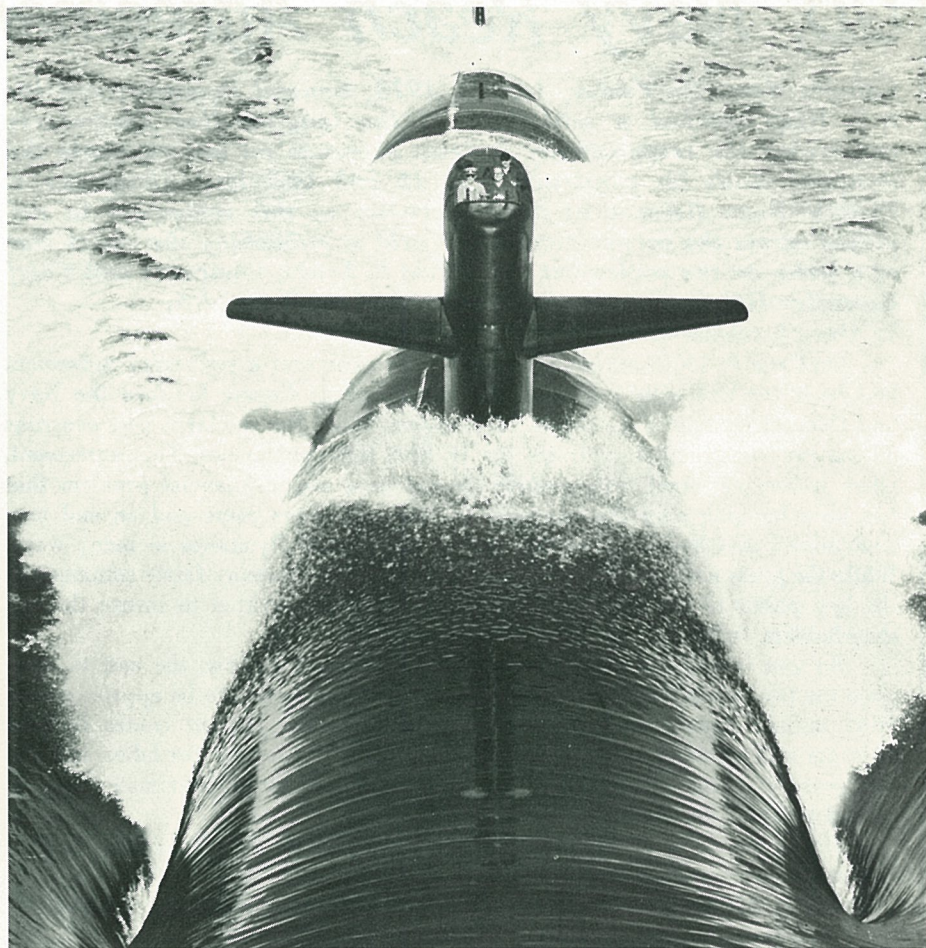


Photo by Fred Webster

**EB's Newest:** Groton (SSN694), Electric Boat Division's third 688-class submarine, slices through Long Island Sound during her sea trials in May. The 360-foot, 6,900-ton nuclear attack vessel, named for the Submarine Capital of the World, was delivered to the Navy June 9th, three weeks ahead of schedule. EB-built sister ships USS Omaha (SSN692) and USS Philadelphia (SSN690) have already joined the fleet.

## LNG Capricorn Is Named During Quincy Ceremony

The third Quincy-built giant 125,000-cubic-meter liquefied natural gas tanker was named *LNG Capricorn* during ceremonies June 19th.

Sponsor for the 936-foot-long, 95,000-ton vessel was Mrs. Campbell McC. Anderson, whose husband is Director (Shipping and Special Projects) of Burmah Oil Co., Ltd., charterer of the liquefied natural gas tanker.

*LNG Capricorn* will enter service transporting LNG from Indonesia to Japan.

*LNG Capricorn's* sister ships, *LNG Aquarius* and *LNG Aries*, have already completed 28 round trips transporting liquefied natural gas.

General Dynamics has contracts to build seven more of the energy carriers. Each has five 120-foot aluminum cargo tanks which are constructed at the company's Charleston, S. C., facility. Gas is transported in liquid form at minus 265 degrees Fahrenheit. The liquefaction process reduces the volume of gas some 600 times.

## Veliotis Awarded NMA Silver Knight

P. Takis Veliotis, General Manager of Electric Boat, has received the highest honor a National Management Association (NMA) Chapter can bestow on an executive.

Mr. Veliotis, until last October President and General Manager of Quincy Shipbuilding Division, was awarded the "Silver Knight of Management Award."

The award recognized Mr. Veliotis for "his leadership and management capabilities which led the Quincy Division from a struggling enterprise to the leading U.S. shipbuilding yard for LNG (liquefied natural gas) ships in just three years."

His conduct "exemplifies the NMA

code of ethics. The imprint of his standard remains with us to this day," the award stated.

Veliotis headed the division for five years.

## F. J. Bettinger Named Corporate Director Of GD Public Affairs

Fred J. Bettinger, a 20-year veteran with General Dynamics, has been named Director of Public Affairs and Advertising for the corporation, David S. Lewis, Chairman and Chief Executive Officer, announced.

Mr. Bettinger, 44, will be responsible for news and information, media relations, advertising and internal communications for the corporation and its divisions and subsidiaries.

Bettinger's previous positions with General Dynamics included public affairs staff and management at the Convair and Fort Worth divisions and at corporate headquarters.

Since 1971 he has served as Director of News and Information for the company's western region. He was graduated from Marquette University in 1956 with a bachelor's degree in journalism.

## GD, Navy Settle Claims Dispute

*Continued from Page 1*

on what was expected to be a smooth production-line operation. As a result, the ships are running about two years late to the original schedules.

For more than three years the company tried very hard to negotiate price increases that would reflect fairly the impact of the Navy-directed changes, without success. This was greatly complicated by the fact that the escalation clauses of the contracts were unable to cover adequately the double digit inflation of the past few years. Thus inflation became a very major contributor to the overrun since the many changes forced work to be done on the ships in later years than had been planned.

During this long period, the Navy did not provide the funds necessary to pay our workers and to pay for materials. At the end of February 1978, the total of expenditures paid by Electric Boat and unreimbursed by the Navy was \$392 million instead of the \$80 million that would represent normal "withholdings" under government contracts. The company provided these funds from money generated by our profitable operations and from bank borrowings.

After months of unsuccessful negotiations, the company advised the Navy on March 13, 1978, that it considered that the contracts had been breached and that the company would cease work on the SSN 688 submarines 30 days later. After the Navy provided additional funds, the company agreed to postpone the date for stopping work to June 11 to allow time for further negotiations.

As our negotiations proceeded and as it became evident what the range of a settlement might be, we evaluated as best we could our alternatives to a negotiated settlement. We believe that we have a strong legal case against the Navy; however, we were advised that litigation on a matter as complex as this could take from five to six years to complete - with unpredictable results. In the meantime, we would have to finance continually increased amounts of "unreimbursed expenditures" with attendant heavy interest payments. We also believed that the working relations with the Navy would become even more strained and the uncertainty posed by this major problem would continue to hang over the company as it has for the past three years.

Finally, after the Navy agreed to pay us back \$300 million of the funds that have been tied up and also agreed that the majority of our "fixed loss" would be paid over the remaining period of construction of the submarines, our Board of Directors decided that it was in the best interests of our employees, our shareholders and our company to accept the settlement described above.

Naturally, we are disappointed that the steady earnings growth pattern of the past few years will be interrupted. We had expected another year of record earnings from operations in 1978, but the fixed loss of \$359 million (\$187 million after taxes) will all be taken this year with the result that 1978 will show an overall loss for the company.

We continue to believe that the future of General Dynamics is very bright. With the return of much of the cash that has been tied up in the SSN 688 program, we should be in fine position to move ahead on our internal growth programs and on possible external acquisitions. And most important of all, the thousands of men and women of Electric Boat can forget the uncertainties and insecurities of the past few months and get back to their traditional jobs of building the world's finest submarines.

Sincerely,

General Dynamics Corporation  
David S. Lewis  
Chairman

## Savings and Stock Investment Values

The GD Savings and Stock Investment Plan unit values for the month of April 1978 were:

<b>Salaried:</b>	
Government Bonds	\$1.9887
Diversified Portfolio	\$1.2591
<b>Hourly:</b>	
Government Bonds	\$1.9879
Diversified Portfolio	\$1.2876
General Dynamics Stock	\$49.875





**Management Leaders.** The annual Management Club Presidents' Conference was hosted recently by Convair Division. Conference delegates reported on the past year's events and outlined plans for future club activities. More than 30 were on hand for the two-day meeting. Represented were: Asbestos Corp.; Convair, including Cape Canaveral, San Diego, and Vandenberg AFB; DatagraphiX; Electric Boat; Electronics; Fort Worth; Pomona; Quincy Shipbuilding; Charleston facility; Stromberg-Carlson, Corporate Headquarters and the National Management Association.

## CRP Awards Presented

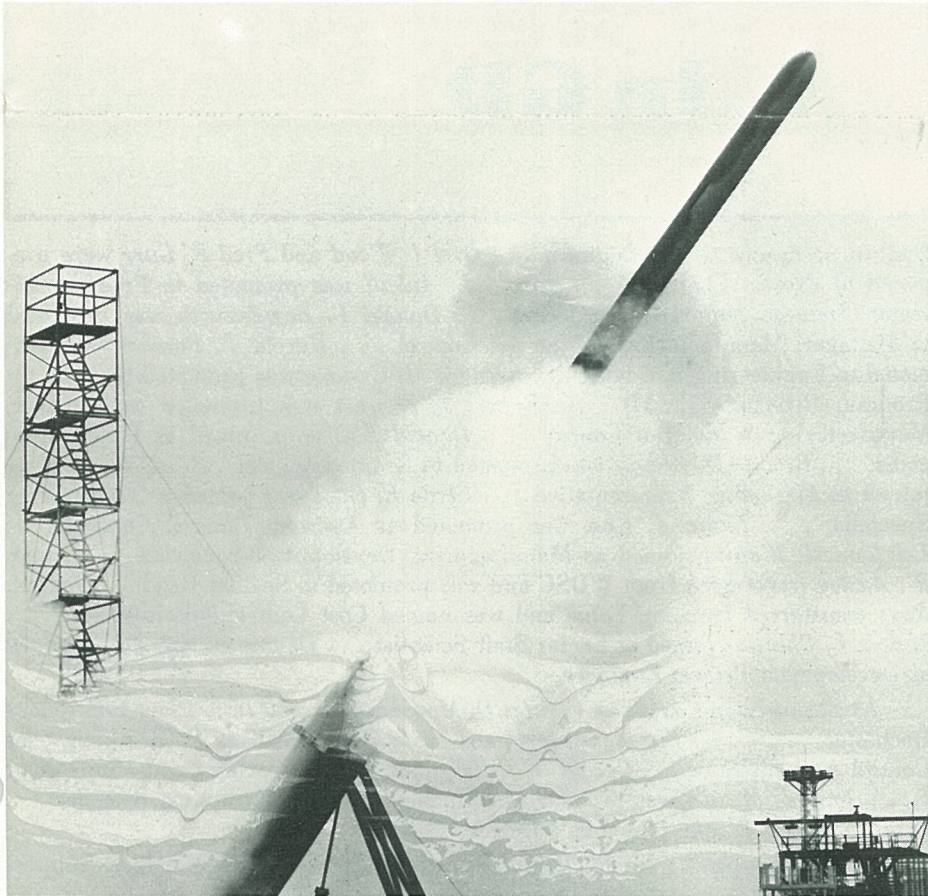
A recent Cost Reduction Program (CRP) Awards Banquet recognized outstanding cost-cutting efforts at Electronics Division in 1977.

The outstanding areas included management systems, controller, manufacturing engineering, industrial engineering, plant engineering, procurement, quality assurance, manufacturing, microelectronics, material control and engineering.

The Employee Suggestion Banner Award, given to the department that submitted the largest number of ap-

proved employee suggestions during the year, was presented to Ron Greenslade and Carl Nelson who represented the engineering department. The department submitted cost reduction ideas which led to savings of \$90,000.

Pete Bergan, Joe Hall, Mel Peabody, Ron Sumner, Warren Wellnitz and Mark Williams accepted the CRP Banner Award for industrial engineering and manufacturing engineering, departments which had the most savings.



**Up and Away.** A Convair-built Tomahawk cruise missile blasts from its trailer-mounted launcher during a recent test at the Pacific Missile Test Center, Point Mugu, Calif.

## Convair Energy Costs Are Skyrocketing

Chances are if you had to pay a whopping \$324,617 utility bill you'd seek ways to save energy.

Although it's not realistic for individual homeowners to run up such a bill, it is absolutely real to industrial users.

In fact, the \$324,617 represents Con-

vair's May bill from San Diego Gas and Electric.

According to Joe Dragonetti, Convair's Energy Conservation Coordinator, there are several reasons for the skyrocketing energy costs at Convair.

"Continually increasing costs for service are being passed on to the user," he said. "May's bill includes a recently instituted rate increase. Probably most important is that we need help in conserving energy around our facilities and that support must come from our employees."

Mr. Dragonetti points out that although the division is ahead of its target of reducing energy costs by 5 percent, more needs to be done. The utility budget for the year will exceed \$4.5 million.

## Little Joe II Joins Display

A piece of space history was added to Rocket Park at the National Aeronautics and Space Administration's Lyndon B. Johnson Space Center in Houston, Tex.

A Convair-built Little Joe II rocket was dedicated as the newest addition to the visitor-oriented space park. Jack Hurt, who directed the Little Joe II program, was on hand to represent Convair for the dedication.

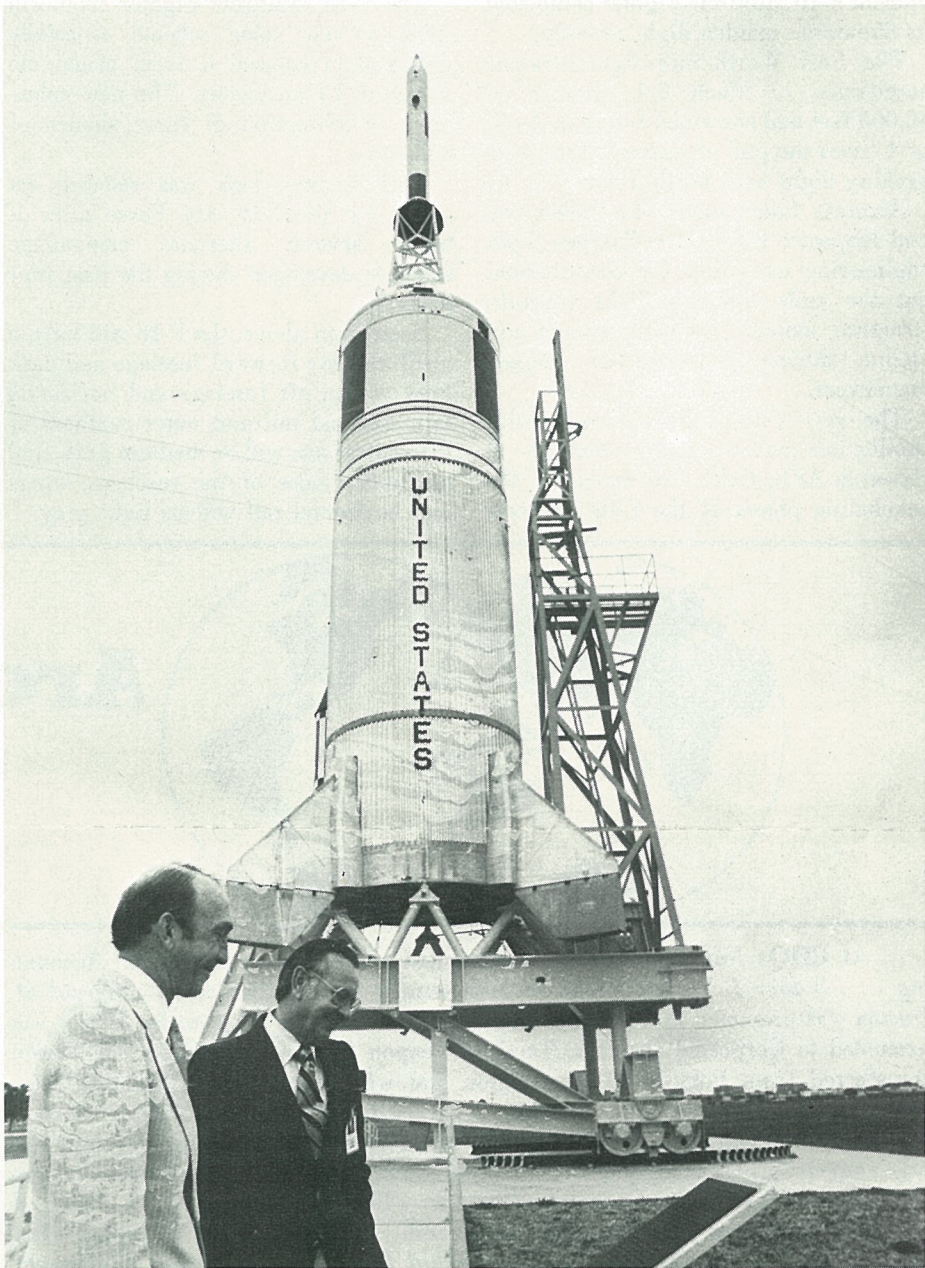
A commemorative plaque describes Little Joe II's accomplishments in contributing to the country's manned space flight program.

It reads in part, "The first major flight tests in the Apollo program were performed by the Little Joe II launch

vehicle. These unmanned flights tested the command module launch escape system and qualified it for operational use in the Apollo program."

Little Joe II was launched five times in the test series carried out at White Sands Missile Range in New Mexico. The command module mounted on the Little Joe II erected at Rocket Park was flown on the fourth flight.

"During its time," the plaque continues, "Little Joe II was the most powerful solid rocket launch vehicle in the U. S. inventory, with a maximum thrust of 816,200 pounds. The trajectory of the vehicle was controlled by varying the launch angle. It was guided by aerodynamic fins and reaction jets."



**Little Joe.** Jack Hurt (left) of Convair Division and Johnson Space Center Director Chris Kraft look over dedication plaque following ceremonies in Houston. The Convair-built Little Joe II launch vehicle in background became the newest addition to the center's Rocket Park.

## Service Awards

### Convair

#### 35 Years

**Operations:** J. Alvarez, I. Bracamontes, J. Rubalcado, J. Butera, C. O. Holba, G. L. Darr, W. D. Arrasmith, G. Lopez.

**Quality Assurance:** F. Lay, F. M. Slonina.

**Research and Engineering:** W. B. Moyer.

#### 30 Years

**Operations:** M. G. Mercer, J. S. Good, F. A. Silvas, C. E. Stieringer, R. D. Coartney, G. W. Ashook.

**Research and Engineering:** L. E. Peterson, S. B. Serio.

**Industrial Relations:** R. J. West.

**Quality Assurance:** A. R. Seitz, J. W. Collins.

**Material:** G. C. Houk, C. E. Mabry, R. D. Beare.

#### 25 Years

**Operations:** T. C. Mitchell Jr., R. A. Gadow, F. H. Felchlin, D. C. Lakin, M. B. Snellings, J. W. Nesseim, A. M. Clark, F. E. Munson, A. Payan, R. D. Renick, R. Hogue, J. J. Jones, E. L. Mudge, K. W. Noonan, W. L. Douglas, J. R. Mac-

kill, C. W. Lacy Jr., L. M. Therrien, L. S. Elmstrom, W. V. Marshall, L. Blea, F. M. Pumar, W. J. Bullock, M. C. Stevens, B. L. Keim, M. W. Nelson, J. W. Palmer.

**Research and Engineering:** H. H. Grogan, J. D. Kring Jr., W. M. Tsunoda, H. S. Arneson, C. L. Johnson, J. A. Kooistra, J. L. Hoover, J. T. Lumgair.

**Quality Assurance:** G. A. Rummel Jr., J. L. Winger, P. J. Asprion Jr.

**Finance:** J. J. Jodka, R. L. Belick.

### Electronics

#### 35 Years

F. B. Wagner.

#### 30 Years

C. G. Franklin, J. R. Skimin, G. E. Boldman.

#### 25 Years

D. L. Briggs, A. Clemens Jr., W. L. Hubbel, D. B. Boehmke.

#### 20 Years

A. G. Malmgren Jr., R. E. Russell, H. T. Fischer, D. W. Bentrott, B. M. McGovern, D. J. Gallagher, J. Y. O'Rourke, G. C. Hogan.

## GD World

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L. Christine Cascella — Associate Writer

Jack Isabel — Contributing editor, Convair Edition



## S-C Unveils New 'Swirl' Design Line of Telephones

Stromberg-Carlson has begun full-scale production and marketing of its popular Slenderet® telephone in a unique colorful "swirl" design.

As the result of a special mixing and baking process developed by Stromberg-Carlson, each telephone has a one-of-a-kind swirl pattern. Initially, the telephones will be offered in four decorator

colors: Butterscotch Swirl, Cherry Swirl, Chocolate Swirl and Mint Swirl.

The Slenderet, with receiver, transmitter, dial and recall switch in the handset, is distributed nationally through traditional telephone outlets and retail distributors.

The new line of swirl telephones is being manufactured at the company's Charlottesville, Va., facility.

## Final Developmental F-16 Completes Its Maiden Flight

The eighth, and last, full-scale development F-16 Multirole Fighter completed its 85-minute maiden flight recently.

The Fort Worth-built fighter-trainer accelerated to Mach 0.9, climbed to 40,000 feet and sustained forces of 4 g's, or 4 times the pull of gravity, during its proving flight over north Texas.

Aircraft Commander Jim McKinney and Inspector Pilot Dave Thigpen, both engineering test pilots for GD, checked out the agile fighter's flight controls, structure, avionics, weapons system and engine during a series of rugged maneuvers.

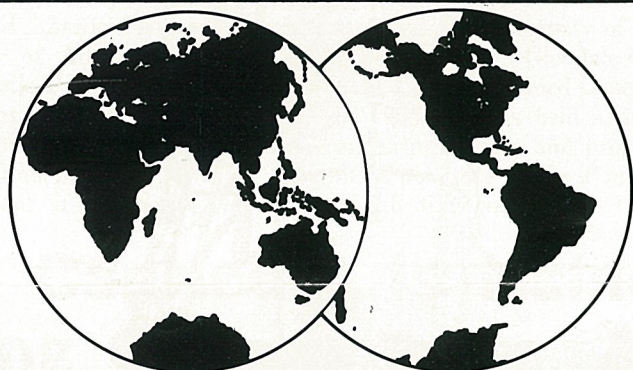
The new F-16, fully equipped with production avionics and systems, is at Edwards AFB, Calif., for service in the concluding phases of the F-16 full-scale

development flight test program.

The F-16 Multirole Fighter soon will sport a new color scheme especially designed to conceal it from visual observation by an enemy. The new colors are a combination of three shades of dull gray.

This smokey look was selected recently by the U.S. Air Force after it tested several alternate camouflage schemes developed during the past four years.

Seen from above, the F-16 will have a medium gray forward fuselage and dark gray wings, aft fuselage and horizontal tail. Vertical tail and outer surfaces of the ventral fins will be medium gray, and the under sides of the fuselage, wings and horizontal tail will be light gray.



## Around the World... ...in GD

**At CHQ:** Nancy E. Cocks was promoted to Supervisor of General Accounting . . . Walter J. Taylor joined as Subcontract Auditor, Senior . . . Gerald M. Huston was promoted to Corporate Director, Cruise Missile . . . Charles Mimbs was promoted to Corporate Director, Tactical Weapon Systems . . . Robert M. Dallas transferred from Pomona to Washington and was promoted to Corporate Manager, Air Launched Weapons Systems . . . Mary J. Eichelberger joined as Corporate Staff Accountant . . . Jack H. Miller transferred from Stromberg-Carlson and was named Corporate Manager, Plant Engineering . . . Jerome F. Cantwell transferred from Pomona as Corporate Director - Business Planning . . . James E. Kanaley transferred from Quonset Point Facility and was named Personnel Manager, Royal Saudi Naval Program . . . Richard J. Lang was promoted to Manager, Internal Audit - Fort Worth . . . David L. Langley transferred from GDCC and was named Corporate Consolidation Accountant . . . Anita M. True was promoted to Corporate Washington Representative - Special Projects . . . Dennis S. Sato joined as Senior Subcontract Auditor . . . Richard A. Turnblad joined as Manager, Internal Audit . . . Melvin A. Collins joined as Corporate Manager of Employee Benefits - Pension Administration . . . Lawrence G. Friedman Jr., joined as Corporate Government Accounting Administrator . . . Warren J. Eding was named Special Assistant - Special Studies for Executive Vice President - Aerospace . . . L. Christine Cascella joined as Associate Writer . . . Carol A. Moreland joined as Corporate Employee Communications Administrator.

**At Convair:** Clayton J. Dennis was promoted to Site Manager, ALCM/Edwards AFB . . . John Silverstein was promoted to Director, Quality Assurance . . . John G. Guidero, Stephen R. Kissick and Hugo A. Hardt joined as Engineering Specialists . . . W. W. Morris transferred from Pomona as Manager - Airlift Flight Operation . . . Leonard A. DelCasale and Francis W. Grosebeck were promoted to Engineering Chief . . . William E. Hutchison was promoted to Engineering Chief (Program Development) . . . Russell N. Babcock was promoted to Director - Procurement . . . Frank D. Robbins was promoted to Director - Manufacturing Control . . . William R. Clarke, Clarence S. Dickerson Jr., and Emmett R. Kimmy were promoted to Engineering Chief . . . Ronald N. Hubbard joined as Engineering Specialist - Senior . . . Barend Mons was transferred from Pomona and promoted to Engineering Manager . . . Steve J. Sultany and Teh-Kan Tung were hired as Design Specialists.

**At Fort Worth:** Glenn S. Evensen joined as Quality Assurance Engineering Specialist . . . Richard A. Pawloski and Richard D. Ward joined as Engineering Specialists . . . Irwin T. Walsh was promoted to Chief of Material Cost . . . Robert C. Morris transferred from St. Louis as Manager of Finance . . . Charles W. Brooks and Paul C. Leamer were promoted to Group Engineer . . . Robert T. Elrod joined as F-16 Business Manager . . . Enrique L. Gomez transferred from St. Louis as Group Engineer . . . Sherman Jackson Jr., and Dain M. Hancock were promoted to Project Engineer . . . Larry L. Allen transferred from St. Louis as Manager of Office Services . . . Frank L. Gaffney joined as Chief of Product Support.

**At Pomona:** James L. Davis, Darryl J. Trulin and William I. Fifer were promoted to Section Head . . . Walter R. Douglas transferred from WDSC and was promoted to Project Engineer . . . James J. May Jr., and Albert W. Doriguzzi were promoted to Engineering Manager . . . Edward G. Schechter joined as Manufacturing Development Specialist, Senior . . . John W. Gebhardt was promoted to

Quality Assurance Group Engineer . . . Oral J. Wood and Fred F. Gurr were promoted to Project Engineer . . . Ronald L. Auletta was promoted to Program Director - Defense Suppression Systems . . . Donald L. Beardsworth was promoted to Manager, Manufacturing & Material Control . . . Harold T. Buscher was promoted to Engineering Specialist . . . Bernard M. Cestone was promoted to Assistant Program Director - DIVAD . . . Robert J. Stewart was promoted to Manager, Manufacturing & Material Control . . . Donald E. Taylor joined as Design Specialist . . . Ronnie D. Abbott was promoted to Group Engineer . . . Alfred M. Diaz joined as Marketing Representative . . . Clyde E. Goodyear joined as Engineering Specialist . . . Leslie A. Kast was promoted as Assistant General Counsel . . . Leighton H. Watling joined as Manufacturing Development Specialist . . . James W. Ausley transferred from WDSC and was promoted to Section Head . . . Lief V. Roys transferred from St. Louis and was named Cost Control Administrator . . . Melvin L. Charters joined as Senior Staff Scientist . . . Dennis G. Schumann joined as Development Project Engineer.

**At Stromberg-Carlson:** Charles D. Moore was promoted to Plant Controller - Rochester . . . C. H. Fletcher transferred from Fort Worth as Software Systems Control Administrator . . . Gerald D. Fritz joined as Engineering Group Supervisor I . . . Jack E. Martin was promoted to Manager, Customer Support Systems . . . Peter S. Vande Weghe joined as Director - Material.

**At DatagraphiX:** Jerold W. Farnsworth was promoted to Manager, Support Services.

**At Electric Boat:** Salvatore Dimauro was promoted to Supervisor, Procurement Quality Control Engineering . . . Walter E. Nagle was promoted to Director - Procurement . . . George E. Trausch joined Quonset Point facility as Manager for Engineering . . . Frank Nasi was promoted to Chief of Procurement . . . Robert A. DiNapoli was promoted to Director, Nuclear Test and Construction.

**At Avenel:** Harry J. Haas joined as Manager of Procurement . . . Donald R. Wilke transferred from St. Louis as Controller.

**At Quincy:** L. Bishop transferred from EB and was named Director of Navy Programs . . . R. B. Geary transferred from EB and was named Director of Engineering . . . H. B. Peterson Jr., transferred from EB and was named Director of Post Delivery Engineering . . . Alan L. Schuler was promoted to Director of Cryogenics Projects . . . Geoffrey R. King was promoted to Manager of Market Development . . . Patrick P. Loftus was promoted to Operations Manager at Charleston.

**At DSS:** Duane J. Kreisel was promoted to Data Systems Supervisor at the Western Data Systems Center . . . Barbara J. Boyd joined as Associate Administrative/Financial Analyst in St. Louis.

**At Electronics:** H. E. Moose transferred from Convair and has been named Director - Material . . . Bob W. Newland transferred from Fort Worth and was promoted to Manager of Marketing - Automatic Test Systems . . . R. Garriott transferred from Convair as Principal Engineer . . . Maurice L. Schiff joined as Engineering Specialist.

**At Asbestos:** Barnabas Kovacs was promoted to Production Manager - Asbestos Operations.

**At GDCC:** Donald Ghidoni was promoted to Product Manager.



# Brown Visits Convair's Cruise Missile Facility

Secretary of Defense Harold Brown reiterated his confidence in the Tomahawk cruise missile program during a July 26th visit to the Convair Division plant in San Diego. He said he was "very pleased" with the progress of the program.

Following a briefing and tour of the cruise missile production facilities at

Convair, Brown told members of the media during a short press conference at the plant that he continues to be convinced that the air launched cruise missile is, and will be, a mainstay of the country's strategic forces.

"I also believe that the other versions of the cruise missile will prove useful in various other applications," he said.

The secretary's visit came a day after he and other top government and GD officials and media representatives saw two Tomahawk cruise missiles successfully launched from the nuclear-powered attack submarine USS *Guitarro* (SSN665) which was under way off San Clemente Island.

Although both missiles failed to

achieve sustained level cruise flight after launch, both were recovered after deployment of their automatic parachute recovery systems. The missiles were brought back to the Kearny Mesa plant where they will be refurbished and then used again in the Tomahawk test program.

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## EB Launches Bremerton, Its 6th 688-Class Sub

*By Jim Reyburn*

The *Bremerton* (SSN698), Electric Boat's sixth 688-class fast-attack submarine, got a rousing sendoff by more than 15,000 guests, employees and their families at her launching July 22d at the shipyard.

Braving 95-degree heat with humidity to match, the crowd waved and cheered as Helen Hardin Jackson smashed the traditional bottle of champagne against the bow of the 360-foot, 6,900-ton sub. Horn blaring, the vessel slid into the Thames River amidst strains of "Anchor's Aweigh," played by the Coast Guard Cadet Band.

David S. Lewis, Chairman and Chief Executive Officer of General Dynamics, said, in referring to the thousands of spectators watching the ceremony:

"These people, the men and women of Electric Boat, have through the years,

The location offered a grandstand view of the event — and the first giant Trident missile sub, *Ohio*, which towered directly behind the spectators. They took home pens and color lithographs of a sub as souvenirs.

The crowd heard the principal speaker, Sen. Henry M. Jackson, Democrat of Washington, call "a large, flexible two-ocean Navy essential in the national interest" and warn that "we are approaching the point where our Navy is too small to perform vital missions."

Senator Jackson declared "the Soviet Union now possesses the world's largest Navy" and "we see continued growth in Soviet naval power." Meanwhile, he said, the U.S. fleet today is one half the size it was in 1970.

Jackson pointed out, "This ship we launch today is inseparable from the skilled Naval personnel that will oper-

*The USS Groton (SSN694), which was built by Electric Boat, was formally delivered to the Navy last month by EB General Manager P. Takis Veliotis. "She bears the imprint of thousands of men and women whose skill and pride are as much a part of her as her steel hull," he said. (See story Page 4).*

rightfully gained the reputation of the builders of the world's finest submarines — and they are the greatest submarine builders in the world."

P. Takis Veliotis, a Vice President of General Dynamics and General Manager of EB, said, "A new submarine takes shape first in the computers and on the drawing boards of our engineers. It is then translated into steel plates, piping and wiring and very complex machinery . . . Thousands of different hands and many different skills played a part in *Bremerton's* creation."

Before, during and following the 35-minute ceremony, the crowd munched 5,000 hamburgers, 4,500 hot dogs and sipped 15,000 cold soft drinks. The refreshments were dispensed from four tents equipped with charcoal grills on the land level facility platform adjacent to where *Bremerton* entered the water.

ate it. We must rigorously maintain the high standards of excellence in training and in operating that have been the special distinction of the nuclear fleet."

Also participating in the ceremony were Secretary of the Navy W. Graham Clayton Jr., and Adm. H. G. Rickover, Director of the Navy's Nuclear Propulsion Program.

Mayor Glenn K. Jarstad of Bremerton, Wash., said his city was proud to have one of the Navy's finest ships named for it.

The submarine, sixth of the class to be built by General Dynamics, will have the most advanced anti-submarine capabilities combined with power weapon systems and electronic sensors. The Navy has already commissioned seven submarines of this class.

General Dynamics has built more than one third of the Navy's current fleet of 112 nuclear submarines.



Photo by Bill Brutzman

*Crowd Watches Bremerton Launch*

## F-16 Is Tortured by Baking, Soaking and Freezing

*By G. Alexander Smith*

As the Florida sun beat down on the cement taxiway a few feet away, a U.S. Air Force sergeant began donning his arctic gear.

He was preparing to assist in conducting a cold weather test on an F-16, and as he put on his insulated pants and heavy boots, the sergeant said, "During climatic testing, we put aircraft and other equipment through more tortures in a few weeks than they will endure in years of active service."

"We can 'heat soak' an airplane up to 125 degrees and drench it with water spray to simulate a tropical rainforest one day, and turn around and cool it down to 40 degrees below zero the next day."

"This is a laboratory, and the F-16 is being subjected to controlled adverse

conditions to determine how it will hold up if it is assigned to the tropics or to the Arctic."

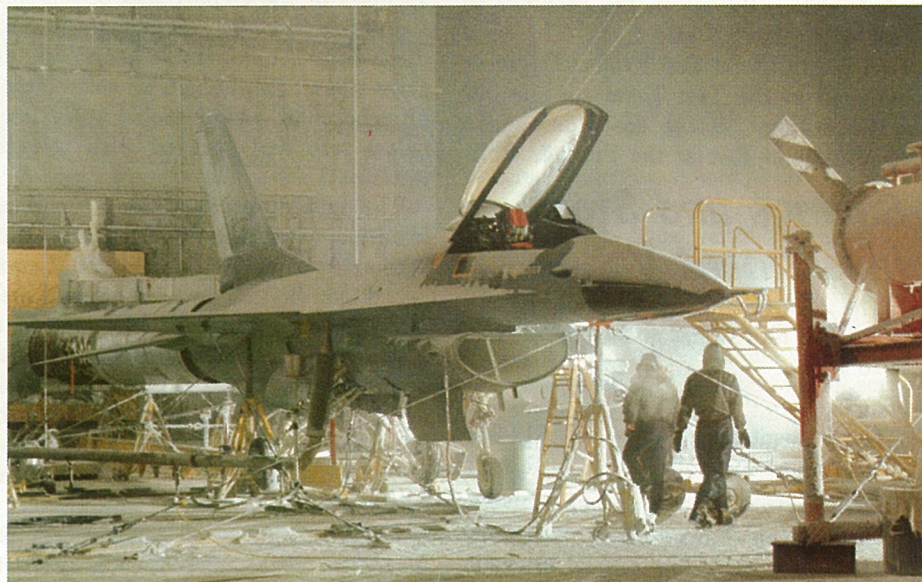
Putting his bulky parka and gloves on, the sergeant continued. "It's not enough to know that a component will work when it's cold — it may be fine at 20 below, but malfunction at 40 below."

"Our job is to insure that wherever an F-16 is assigned, the airplane can take the adverse environment."

Finally suited up, the sergeant and his partner opened a personnel door of the huge McKinley Climatic Laboratory at Eglin AFB in Florida, and disappeared into a cloud of water vapor that formed as the frigid air from inside the chamber met the hot, humid Gulf air outside.

Inside the climatic chamber, the sergeant and a crew of technicians began

*Continued on Page 2*



*An F-16 at 40 Below Zero*



## GD-Avis Car Rental Rates Now Available for Employee Vacation or Personal Trips

GD employees are now able to rent automobiles for their personal use from the Avis Corporation and receive the same discounted rates that the corporation has negotiated for its use.

The corporation receives a discount because of the volume of business it conducts with car rental agencies, and the rates for employees who wish to rent cars for vacation trips or other personal use should be very attractive.

Employees who wish to rent cars from Avis can obtain the corporate rental rates by 1) presenting their employee identification card or badge at an Avis counter, and 2) using the General Dynamics account number A/A 560100. The account number will alert Avis counter personnel to use corporate discount or flat rate charges for the par-

ticular class of car the employee wishes to rent.

Approval of any rental contract between Avis and a GD employee will depend on the individual's credit status and driver license validity.

Payment will be made by the individual to Avis — General Dynamics will not accept any billing charges for the employee's personal use of Avis rental cars.

Avis has two rate plans available. One is the standard time and mileage costs minus a certain discount. The other plan is a fixed flat rate daily charge.

Both plans require the user to pay for gasoline.

Rates and discount information are available to employees through either the Travel Section or Corporate Material Agreement Coordinator at each division or plant.

## Final COMSTAR Now in Orbit

The third and final COMSTAR communications satellite lifted off to its destination 22,000 miles above the Equator roughly south of New Orleans, late in June.

Convair constructs the Atlas/Centaur booster for Comsat, owners of the satellite. The spacecraft itself is of Comsat design.

Twin COMSTARS — also launched by Atlas/Centaurs — already are stationed at different points above the Equator.

COMSTAR, a high-capacity system, will be able to handle more than 14,000 telephone conversations for the 50 states and Puerto Rico.

## Freezing and Baking an F-16

### Continued from Page 1

readying an F-16 for a cold weather test — a simulated flight at 40 degrees below zero. The sleek, camouflage-painted F-16 was sitting on jacks with restraining cables attached.

The multirole fighter's skin was covered with a thick frost, and sensor wires and exhaust ducting were attached to the airframe.

The F-16's test was conducted very much like a test flight — the only difference being that the plane never left the jacks it was resting on.

Air Force Maj. Gary W. Matthes, a directing member of the F-16 Joint Air Force/GD Test Team, made a normal preflight "walk around" inspection of the aircraft and then climbed into the cockpit. After the F-16's engine was started, Matthes went through a flight test plan of operations designed to evaluate the airframe and system's performance under conditions of harsh Arctic weather. The canopy was cycled, the landing gear was raised and lowered and the flight control systems were operated.

Listening to Matthes' voice on the intercom, the only major variation between an actual test flight and the climatic test was that before he advanced or retarded the F-16's throttle, he called out his intention to the laboratory personnel.

"As the engine is run, the exhaust is ducted to the outside, and the laboratory must replace the air in the chamber as fast as we use it," said C. C. Widaman, Fort Worth Flight Test Project Engineer assigned to the Test Team for the climatic testing. "If the lab didn't make up the air as fast as the Pratt & Whit-

ney F100 engine used it, we could collapse the walls of the chamber."

The main chamber of the McKinley Climatic Laboratory has walls 18 inches thick with 12 inches of fiberglass insulation. They are designed to expand and contract as the temperature inside the chamber changes from 165 degrees above zero to 65 degrees below.

The temperature inside the chamber is controlled by a huge cooling system which passes outside air through brine-cooled heat exchangers.

Almost an hour into the cold test at Eglin, Matthes tested the F-16's 20-mm. cannon by firing a burst into a bullet catcher.

A voice over the intercom announced that the laboratory had only another five minutes of cold brine to make up cold air for the chamber; so the major simulated a landing, taxi and engine shutdown.

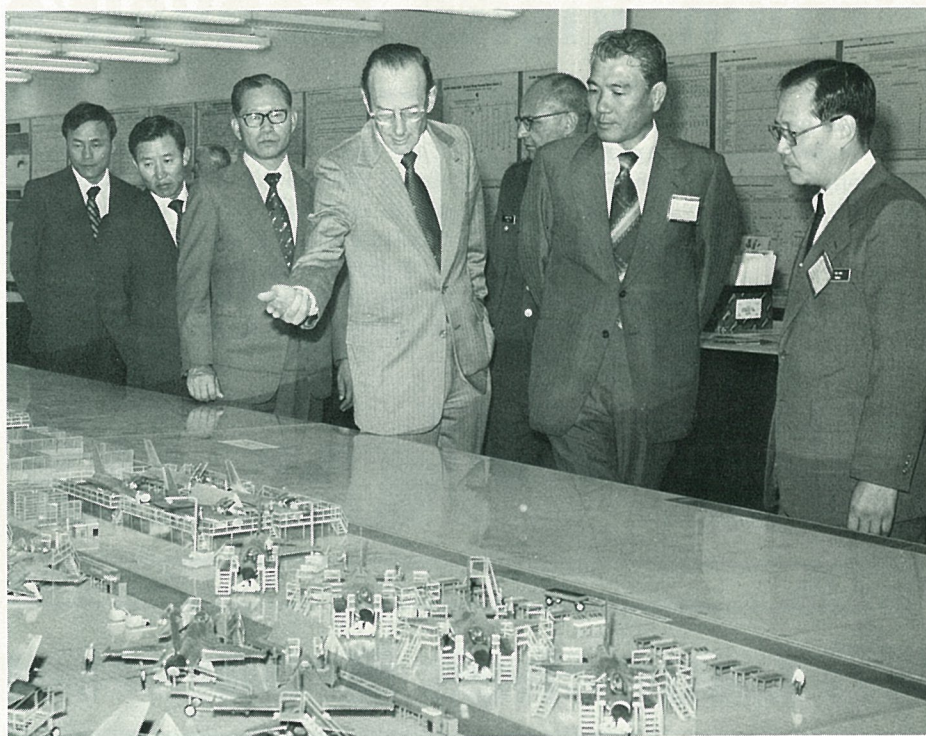
The laboratory itself was built in 1947 and has been used to test more than 200 U.S. military aircraft and 1,600 miscellaneous pieces of military equipment. The main chamber of the test facility measures more than 200 feet on a side and is three stories high — long enough and high enough to hold the largest transport or bomber.

The laboratory is operated by the Armament Development and Test Center of the Air Force Systems Command and performs environmental tests for all agencies of the Department of Defense.

In three months of climatic testing, the F-16 airframe was heated to 160 degrees above Fahrenheit by solar lamps, drenched with water, cooled down to 65 below zero and sprayed with freezing water.

The laboratory tests were completed in June, and the F-16 headed for hot arid climate tests at El Centro Naval Air Station in California. Later, tropical tests will be conducted at Howard AFB in the Canal Zone, Arctic tests will be held at Eielson AFB in Alaska and, finally, the F-16 will be subjected to adverse wet weather tests in three North Atlantic Treaty Organization countries.

Climatic testing of the F-16 is expected to take more than a year to complete.



**Minister's Visit.** The miniature F-16 assembly line that is used by Fort Worth personnel for planning purposes is shown to South Korean Minister of National Defense Ro Jae Hyun (second from right) and his party by Fort Worth Vice President and General Manager Richard E. Adams (center). Minister Hyun and his party later toured the mile-long assembly line and were briefed on the status of the F-16 Program.

## Sec. Brown Reiterates His Faith In the Cruise Missile Program

### Continued from Page 1

Preliminary indications are that, in both instances, the boost motor used to get the Tomahawk out of the water and airborne to cruise altitude did not separate from the missile.

Commenting on his tour, Brown said that it was a chance to see one of the recovered missiles and to get the preliminary diagnosis of the reason for the failures.

So far in the Tomahawk test program, the missile has flown 33 times —

26 successfully. There have been two partial successes and five failures.

Convair is developing submarine launched and surface ship launched cruise missiles for the U.S. Navy and a ground launched cruise missile for the Air Force's Tactical Air Command.

The division is also competing for the air launched cruise missile program. A flyoff competition between Convair's AGM-109 and a competing missile begins next year at Edwards AFB, Calif.



**Secretary's Briefing.** Sec. of Defense Harold Brown (left) receives a briefing on the Convair cruise missile program from Dr. Leonard Buchanan, GD Vice President and General Manager of Convair, during a tour of the Convair plant on July 26th.

## N. C. Stranberg Appointed GD's Director for European Marketing

Norman C. Stranberg has been appointed Director - Europe for General Dynamics' International Marketing operation. Headquartered in the company's Brussels, Belgium office, Mr. Stranberg will be responsible for directing and coordinating all General Dynamics marketing activities throughout Europe and will provide support and assistance to the company's various operating divisions.

A native of Jamestown, N.Y., Stranberg joined General Dynamics in 1956 at Fort Worth and has held a number of flight test, engineering, operations

research and marketing positions with that division, most recently as Director - F-16 Multirole Fighter Marketing.

Stranberg was graduated from the University of Tennessee in 1956 with a Bachelor of Science degree in mechanical engineering and earned a master's degree in mechanical engineering from Southern Methodist University in 1962. He served in the U.S. Air Force from 1950 to 1953.

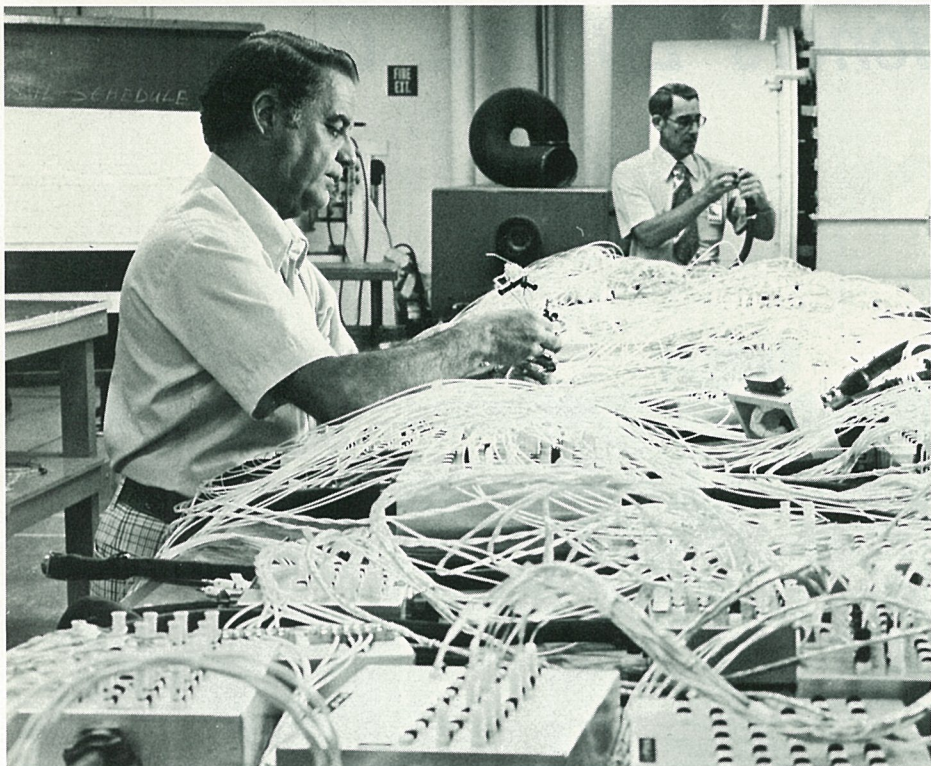
Stranberg replaces James J. Murphy, who has been transferred to Pomona as Vice President - Marketing.

## Savings and Stock Investment Values

The GD Savings and Stock Investment Plan unit values at the end of May 1978 were:

<b>Salaried</b>	
Government Bonds	\$1.9961
Diversified Portfolio	\$1.2621
<b>Hourly</b>	
Government Bonds	\$1.9929
Diversified Portfolio	\$1.2906
General Dynamics Stock	\$60.25





Testing ALCM. Andre Couillard (left) and Woody Woodward check the wiring and testing system for the AGM-109 Air Launched Cruise Missile at Convair.

## GPS Will 'Revolutionize' Navigation, Henderson Says

The Global Positioning System (GPS) will "revolutionize the navigation field as we know it today," Col. Don Henderson, NAVSTAR GPS Program Manager in the Space and Missile Systems Organization of the Air Force Systems Command, told Electronics personnel recently.

The GPS will use a 24-satellite network to provide aircraft, ships and surface vehicles position information accurate to within 10 meters.

Electronics Division is the system developer and integrator for the GPS validation phase for control segment and user equipment. George F. Breitwieser is Electronics' GPS Program Manager.

The division has already installed the GPS master control station at Vandenberg AFB, Calif., and four special monitoring stations located in Alaska, Hawaii, Guam and California.

The ability to use GPS to assist in bombing is of major interest to the Air Force, the colonel said.

"If I know the coordinates of a target, I can hit it during the day, night or adverse weather conditions," Henderson said. "This is the capability we lack worldwide right now — and the capability that GPS promises to provide."

"Eventually GPS, if not on the cruise

missile itself, will certainly be on the launch platform, whether it be an airplane, submarine or ground application — GPS is going to be essential for the accuracies that we require from the cruise missile.

"GPS will allow us to perform new tactical and strategic maneuvers that were considered in the past, but have been discarded," Henderson said.

"Photo mapping and photo targeting will be greatly improved by GPS," he said. "This will be useful to the Defense Mapping Agency or anyone else who is interested in being able to precisely locate himself, either at sea or on land."

For the Air Force and the National Aeronautics and Space Administration, GPS will provide precision satellite tracking — the ability to track low Earth orbit satellites and do it covertly.

The GPS program is nearing the end of its Phase 1 concept validation. The next major milestone for the program is the Defense System Acquisition Review Council decision which is expected early next year.

"The management support for this program has been exceptional," Henderson said. "I need the continued excellent performance and dedication of your GPS personnel."

## Service Awards

### Convair 35 Years

**Operations:** E. B. Kerfeld, S. J. Webster.

**Finance:** J. W. Kieff.

**Quality Assurance:** E. E. Chavez.

### 30 Years

**Operations:** M. S. Payne, O. A. Copley, E. S. Slovacek Jr., E. T. Pemberton, M. F. Castro, A. B. Ireland, R. A. Berman, W. A. Fields.

**Quality Assurance:** L. L. Walker.

### 25 Years

**Operations:** R. J. Welsh, C. V. Coffey, E. Thompson, B. B. Bludworth, J. M. Neal, V. W. Walsh, E. D. Robertson,

W. L. Worthington, P. K. Hawkins, C. Edwards, F. R. DeGreef, U. G. Garside, E. C. Cass, D. W. Bryant, J. F. Armstrong, H. D. Moore, A. Alimonti.

**Finance:** J. K. Bishop, J. Albano, H. J. Hartin, F. B. Spieker.

**Research and Engineering:** R. M. White, T. J. Fleck, F. R. Sedland, L. R. McClain, C. R. Maikish, N. J. Callas.

**Data Systems Services:** B. J. Sjoblom.

**Quality Assurance:** W. D. McNeil, J. W. Blankenship, M. E. Howell.

**Contracts:** A. J. Krieger, R. M. Tambornino.

### Electronics

#### 30 Years

J. A. DeTate.

#### 25 Years

D. J. Alameda, C. A. Goeb Jr., R. A. Izzarelli, R. R. Christy, L. L. Schultz.

#### 20 Years

F. N. Johnson, J. T. Stebbins, D. Brown, J. E. Coxey, A. J. Cali, F. T. Santos, R. E. Thompson, T. Matsumoto, R. H. Schmidt, P. T. Yashuhara.

## Mothballed B-52 Rebuilt For New Mission at Convair

A B-52 strategic bomber, long ago retired from the U.S. Air Force and stored in the Arizona desert, has been given a new mission.

The bomber had been retired from active service and mothballed in the desert near Tucson, Ariz., at Davis-Monthan AFB.

But the bomber was cut up into small sections, trucked across the Sierra Nevada mountains to San Diego and is being reassembled at Convair. The plane will serve as a systems integration laboratory for analysis, design and check-out of the AGM-109 — Convair's entry in the Air Launched Cruise Missile competition.

The competitive flyoff of Convair's AGM-109 against a missile of another company will determine which company will receive the contract to build the Air

Force's strategic missile which will be launched from B-52 bombers or wide-bodied jet cruise missile carriers.

The AGM-109 technicians have reconstructed the B-52 at Convair to insure the strategic Air Force version of the Navy's Tomahawk cruise missile is designed to fit the bomber's loading, carrying and support capabilities.

N. D. Showalter, Convair Integrated Logistics Support Manager, suggested the best method to insure that the AGM-109 would work with the B-52's design was to obtain one.

In order to conduct the AGM-109 tests on the B-52, a whole aircraft was not necessary.

Instead, Convair personnel obtained most of the fuselage — one part 10 feet high and 60 feet long — and part of one wing.



Secretary's Briefing. Sec. of Defense Harold Brown (facing group) briefs the press and observers at Convair about the cruise missile program. In background is the B-52 which is being reassembled at Convair as a systems integration laboratory for the AGM-109 Air Launched Cruise Missile.

## Atlas Rocket Boosts Craft To Study Seas from Space

SEASAT, the first satellite especially designed to study the oceans from space, lifted off for its "proof of concept" mission from Vandenberg AFB in California last month.

Convair built the Atlas portion of the Atlas/Agena rocket that powered the SEASAT into its 500-mile-high orbit.

Scientists will determine whether SEASAT's microwave instruments can send back useful information on surface

winds and temperatures, currents, wave heights, ice conditions, coastal storm activity and ocean topography during its 14 daily orbits of the earth.

SEASAT was the longest and heaviest spacecraft ever launched by an Atlas F. Its instruments will relay data from 95 percent of the oceans' surfaces every 36 hours. Real feedback, however, won't be available for about six months while scientists calibrate the instruments.

## German Charter Airline Places Order for 2 DC-10s

The DC-10 wide-bodied trijet has yet another name on its long list of international buyers.

Condor Flugdienst, a charter subsidiary of Lufthansa German Airlines, placed an order for two DC-10s with McDonnell Douglas Corp. The German airline also placed an option for a third.

Convair Division fabricates the major

portion of the DC-10 fuselage under subcontract from McDonnell.

Condor is the 43d airline to select the DC-10. Its charter services, based in Frankfurt, Germany, commute from West Germany to the Mediterranean, the Middle East and South and North America.

## Pomona Awarded National Plant Maintenance Prize

Pomona Division has been named co-winner in a national competition for the Plant Engineering Program Award of the American Institute of Plant Engineers.

The Pomona plant, the first industrial facility designed and built for the development and production of tactical missiles, received special recognition for its computerized preventive maintenance program.

Under that program, problems are controlled before they require major repairs or halt manufacturing lines, according to Ernie Shaffer, Plant Engi-

neering Manager. A computer schedules preventive maintenance requirements on a daily, weekly and monthly basis.

The program, coupled with a skilled maintenance crew, has resulted in service calls for breakdowns of equipment being cut in half. Machine availability has increased 40 percent while scrap rates have been reduced 58 percent.

"All this happened during a time when our machines and equipment in service increased by 25% and the run time per doubled," Mr. Shaffer explained.

## GD World

Published by General Dynamics Corporation, Pierre Laclede Center, St. Louis, Mo. 63105

G. Alexander Smith — Manager of internal communication  
L. Christine Cascella — Associate Writer  
Jack Isabel — Contributing editor, Convair Edition



# Commissioning Ceremony Honors EB and Groton

Last month, before 1,000 spectators, the USS *Groton* (SSN694) was commissioned. It was the third time that the Connecticut community has lent its name to a U.S. Navy vessel.

The latest USS *Groton*, a nuclear-powered attack submarine, 360 feet long and displacing 6,900 tons submerged, is the third 688-class submarine built by Electric Boat that has been delivered to the Navy.

Guests at the ceremony, held at the Naval Submarine Base in New London-Groton, included former Attorney General and Secretary of Commerce Elliot Richardson and his wife, Anne. Mrs. Richardson had christened the *Groton* in 1976.

Connecticut Sen. Abraham Ribicoff was the principal speaker at the ceremony which culminated a week of city-wide events to honor the ship, and he had great praise for EB employees.

"Anyone," he said, "who has been in

a shipyard knows the work is hard. In building a submarine, there's no room for mistakes. Perfection is the norm."

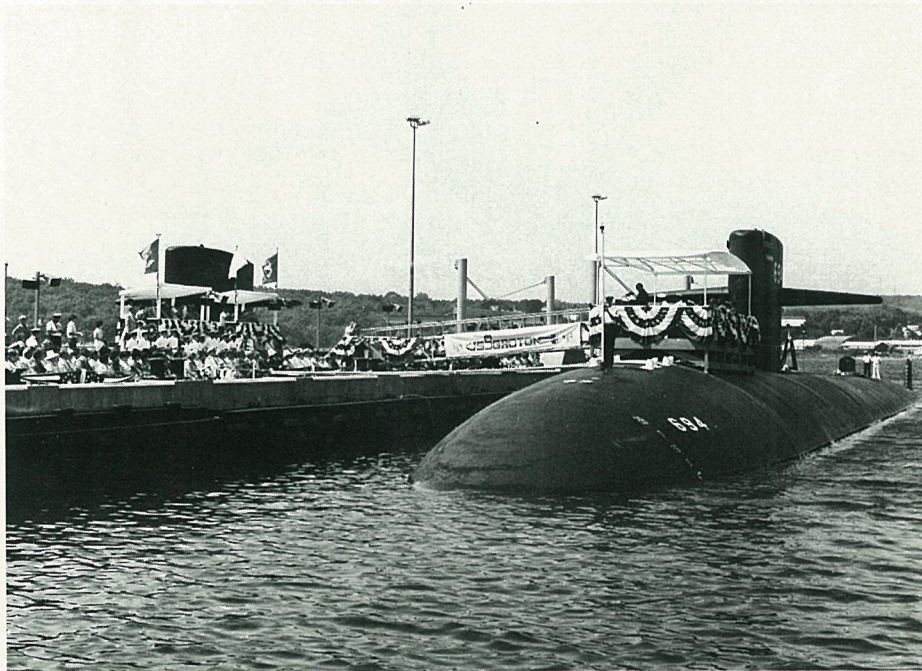
Electric Boat General Manager P. Takis Veliotis formally delivered the ship and also praised the people who built it.

"She bears the imprint of thousands of men and women whose skill and pride are as much a part of her as her steel hull," he said.


The Navy now has seven 688-class attack submarines in commission, all named for cities. They are the USS *Los Angeles*, the USS *Baton Rouge*, the USS *Philadelphia*, the USS *Memphis*, the USS *Omaha*, the USS *Cincinnati*, and USS *Groton*.

This brings the number of commissioned nuclear submarines in the U.S. fleet to 112.

Electric Boat has contracts with the Navy to build 15 additional 688-class submarines.



USS *Groton* at Commissioning



**BETTER THAN THE BEST**

**THE F-16**

To dynamic young Dave Wheaton, the F-16 means another milestone success in an outstanding career as an engineer and former fighter pilot.

To the U.S. Air Force and to six allied nations, the multirole F-16 means maneuverability, versatility and dependability. Co-production in four NATO countries means

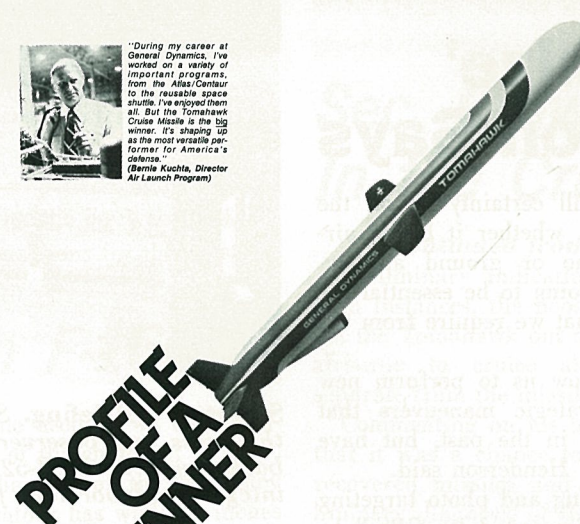
unique economical and military advantages. With its light weight, long range and superior avionics, the Free World's hottest new fighter gets there first and delivers its ordnance when needed.

The F-16 has been called "the fighter aircraft of the 21st century"—largely because of bright designers and engineers just like Dave Wheaton. To them, the best can always be made a little better. It's the kind of achievement America has come to expect of General Dynamics.

If aerospace opportunity interests you, write: R. H. Widmer, Vice President—Engineering 1519 Pierre Laclede Center St. Louis, MO 63105

**GENERAL DYNAMICS**

<b>Aerospace Group</b> <b>Fort Worth Division</b> Fort Worth, TX 76108 F-16, F-111, Republic Radar Systems, Advanced Tactical Aircraft	<b>Convair Division</b> San Diego, CA 92123 Tomahawk, Space Shuttle Mid-liftstage, Atlas Centaur, Deep Space Systems, DC-10 Fuselage	<b>Electronics Division</b> San Diego, CA 92123 SOTAS, Test Range Instrumentation, Automatic Test Systems, Navstar GPS	<b>Pomona Division</b> Pomona, CA 91766 Phalanx, Standard Missile, Singer, Sparrow AIM-7F, DIVADS, Vigil
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**PROFILE OF A WINNER**

"During my career at General Dynamics, I've worked on a variety of important programs, from the Atlas Centaur to the reusable space shuttle. I've enjoyed them all. But the Tomahawk Cruise Missile is the big winner. It's shaping up as the most versatile performer for America's defense."


When vigorous, aggressive Bernie Kuchta and other engineers at General Dynamics' Convair take on a problem, they don't quit until they've solved it. All of it. This kind of determination is one reason why ship and submarine-launched versions of the Tomahawk Cruise Missile have already been test flown and are under development for the U.S. Navy. Now, Convair is readying ground and air-launched models for the U.S. Air Force that will also fly under radar and strike specific targets with the same unprecedented accuracy. The Tomahawk, with its large payload, long range and ability to meet either strategic or tactical requirements, is the latest example of Convair's advanced technology.

Success of Tomahawk is largely due to outstanding technical experts just like Bernie Kuchta who will fight the toughest engineering challenges until they win. It's the kind of achievement America has come to expect of General Dynamics.

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**FASTEST GUN IN THE WEST**

"Engineers at General Dynamics work with extraordinary freedom. As a result, our team here at the Pomona Division has developed some of the most advanced gunfire control systems in the world. Phalanx is a prime example. We call it the fastest gun in the West." (John McSweeney—Vice President, Tactical Systems)

Phalanx, now scheduled for widespread installation aboard U.S. Navy vessels, represents one of the most vital elements in our fleet's anti-missile defense system. Designed for close-in shipboard protection, the radar-directed Phalanx utilizes an incredibly accurate closed-loop fire control system with a very high rate-of-fire gun to knock out incoming missiles and aircraft. Its sophisticated electronic technology and unique hardware integration combine to make Phalanx an impenetrable defense. Young and innovative John McSweeney has every right to acclaim his Phalanx team. When given the opportunity to do things differently, to find the unconventional solution, they developed this radically new fleet protection concept. It's the kind of achievement America has come to expect of General Dynamics.

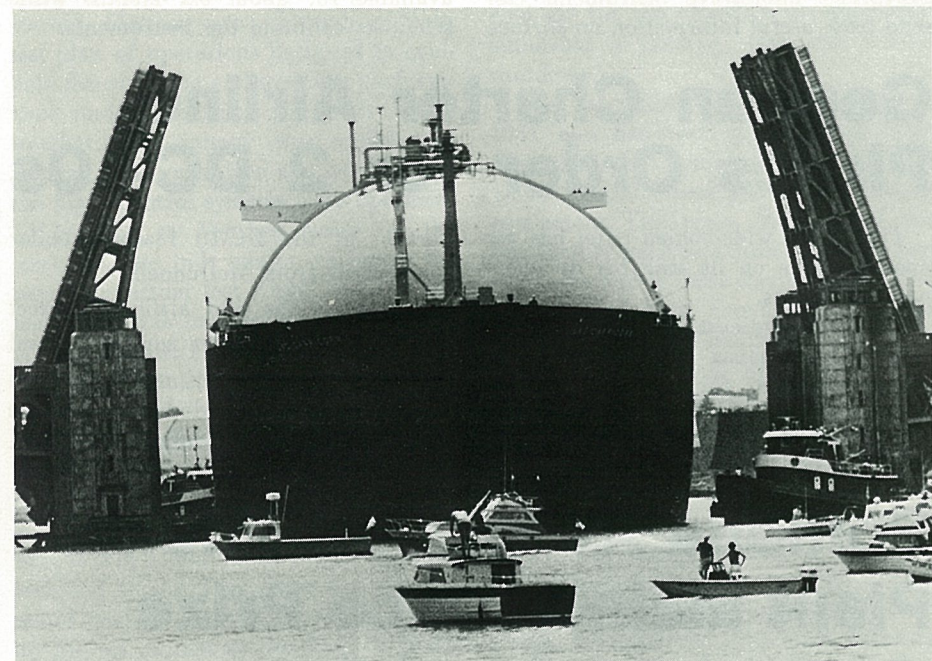
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**Aerospace Ads.** These three advertisements, first in a scheduled series of ads featuring General Dynamics aerospace products and people, are currently appearing in 10 technical and trade magazines. The campaign, promoting programs at the Convair, Fort Worth, Pomona and Electronics divisions, began in June and will continue through June 1979. The single-page, black

and white ads are slated to run in Aviation Week & Space Technology, Air Force, Astronautics & Aeronautics, Armed Forces Journal, Army, Electronic Warfare, National Defense, Sea Power, Marine Corps Gazette and U.S. Naval Institute Proceedings.



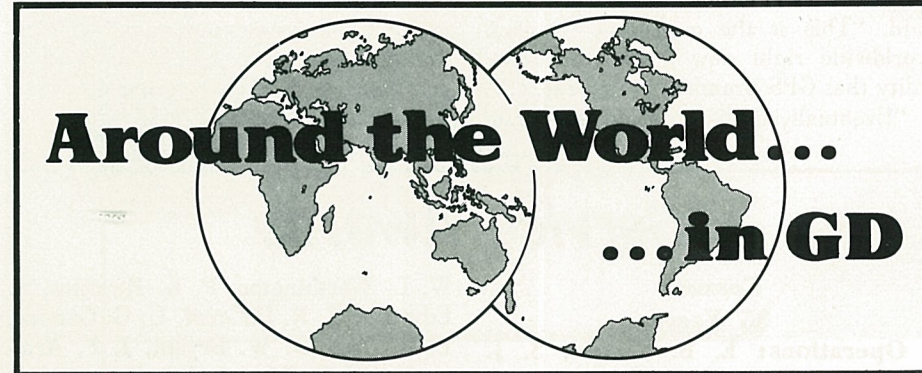
**Like Threading a Needle.** With tug boats assisting and small craft standing by, LNG Capricorn, Quincy's third liquefied natural gas tanker, passes through the Fore River drawbridge on her way to the open sea. The 936-foot, 95,000-ton ship left Quincy June 21st.

## Tooling Begins on AF Tanker/Transport

Convair Division has begun to tool up for the production of the fuselage of the U.S. Air Force's new Advanced Tanker/Cargo Aircraft, recently designated the KC-10A.

The Air Force has said that approximately 20 KC-10As would be procured to increase the mobility of U.S. forces.

The KC-10A will be able to refuel fighters and carry their support equipment on overseas deployments. It will also be able to refuel airlift aircraft on deployments, and strategic offensive and reconnaissance aircraft during long-range operations.



**At CHQ:** Richard S. Burrows and Danny R. Wilson joined as Auditor . . . James A. Blanchard transferred from Datagraphix as Manager of Corporate Purchasing . . . Vincent M. Melesko joined as Senior Auditor . . . Mary Ann Tipton rejoined as Corporate Personnel Administrator . . . James G. King joined as Senior EDP Auditor . . . Jerome R. Sonnabend was promoted to Corporate Flight Captain.

**At Electronics:** Albert R. Noland joined as Vice President & Program Director - Tactical Data Systems . . . Howard C. Johnson was promoted to Section Head - Engineering . . . Donald C. Longacre joined as Principal Engineer . . . Robert J. Rechter joined as Engineering Manager.

**At Pomona:** Anthony Daukas joined as Engineering Specialist . . . W. W. Winfield transferred from Material Service as Personnel Administration Manager . . . Donald J. Lynch was promoted to Engineering Manager.

**At Stromberg Carlson:** P. D. Weaver transferred from Pomona as Senior Account Representative.

**At Convair:** Dario E. DaPra was named Assistant to the General Manager . . . James F. Burns, Jr. was named Vice President & Program Director, R.S.N. Program . . . Harry B. Rogers transferred from St. Louis as Contract Coordinator.

**At Fort Worth:** L. A. Parker transferred from CDSC as Project Engineer.

**At Material Service:** Alan M. Smith joined as Assistant Vice President, Aggregate Operations.

**At Electric Boat:** Arthur W. Dulemba joined as Director of Industrial Relations . . . Charles W. Holland Jr. was promoted to Manager, Nuclear Operations.



# Navy Settlement Ends Period of Uncertainty

The settlement of the long-standing 688-class submarine contract dispute between GD and the U.S. Navy brought to an end "a very long period of uncertainty and serious cash drain," David S. Lewis, Chairman and Chief Executive Officer, said in announcing the financial results for the second quarter.

"We are also very encouraged by the improved submarine construction performance on the Trident program and on the SSN 688-class submarines currently in work at Electric Boat," he continued.

The settlement meant that the corporation's earnings for the period, \$30.7 million, or \$2.87 per share of common stock, were reduced to a net loss of \$156.0 million, or \$14.61 per share. This

compared to earnings of \$29.8 million, or \$2.71 per share, for the same period of 1977.

Sales for the second quarter and first half of 1978 were \$789 million and \$1.5 billion, respectively, compared with \$767 million and \$1.4 billion for the same periods of 1977.

Total funded backlog at the end of the second quarter of 1978 was \$8.08 billion, compared to \$5.57 billion a year ago. Funded and unfunded backlog was \$10.09 billion this year, compared to \$7.04 billion at the same time last year.

Mr. Lewis said that Fort Worth, Convair, Pomona and Quincy Shipbuilding divisions recorded excellent performances during the second quarter of 1978.

"Several of our commercial and resources components showed improved performance in the quarter relative to last year," he said. "However, the after-effects of the nationwide coal strike led to continued disappointing performance in the coal operations in the second quarter."

The dispute with the Navy concerned two construction contracts for 18 688-class submarines being built by Electric Boat. A settlement of the dispute was negotiated with the Navy on June 9th and became final on Sept. 20th, after the expiration of a required period for Congressional review.

"With this problem behind us, we can

now move ahead to take advantage of the many significant opportunities for growth available to the company," Lewis said.

According to Lewis, under generally accepted accounting principles, the entire fixed loss of \$186.7 million (or \$359 million before taxes) must be taken in the second quarter, even though most of the losses would actually be incurred over a period of years as work on the remaining submarines is completed.

He also said that one of the key elements of the settlement is an agreement by the Navy to pay the company \$300 million to cover expenditures on the program that had been unreimbursed.

## GD World

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### Inside the World

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## First European-Produced F-16s Near Delivery

By Rob Mack

With delivery of the first European-built F-16 multirole fighter just three months away, production of F-16 parts and assembly of components is fully underway at 28 cities in Belgium, Denmark, the Netherlands and Norway.

The Belgian Air Force will accept the first of its force of 116 F-16s in January from SONACA and SABCA, two aerospace firms which are co-operators of the Belgian assembly line.

Belgium's Beauvechain Air Base will become the first F-16 base in Europe.

The Royal Netherlands Air Force is scheduled to take delivery of the first of its 102 F-16s in June from Fokker-VFW, which operates the Dutch assembly line.

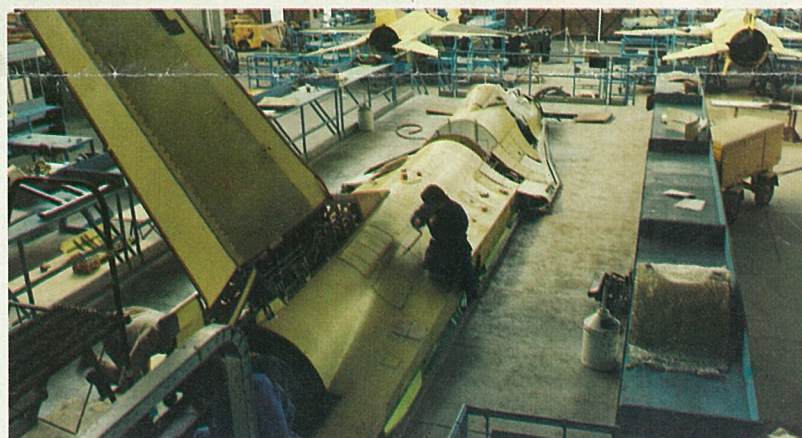
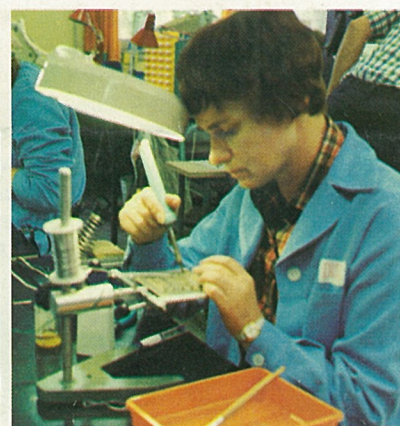
In addition, Fokker will turn over the first of 72 F-16s to the Royal Norwegian Air Force in January 1980, the same month that SONACA and SABCA deliver the first of 58 F-16s to the Royal Danish Air Force.

Currently, five F-16s are in final assembly at Fokker, and 10 more are in final assembly at SONACA and SABCA.

Meanwhile, Fort Worth Division has delivered two production F-16s to the U.S. Air Force and another 10 are in final assembly. Hill AFB, Utah, has been designated to serve as the F-16 system logistical center and is scheduled to receive its first F-16 in January.

The first 1,500 F-16s will be assembled from components manufactured in all five coproducing countries. The 100th aircraft, for example, will be the 19th F-16 delivered by the Belgian assembly line. It will be the Royal Danish Air Force's first two-seat F-16 and will be made up of the 55th forward fuselage produced by Fort Worth, the 23d center fuselage manufactured by Fokker, SONACA's 12th aft fuselage, SABCA's 29th set of wings and SONACA's 22d vertical stabilizer.

So far in the F-16 program, prototype, full-scale development and production aircraft have made more than 2,300 flights. This includes more than 2,900 hours of flying time and more than 70 hours of supersonic flight.



**Taking Shape.** At numerous sites across Belgium, Denmark, the Netherlands and Norway, European-built F-16 components are taking shape, and F-16s are being built on two assembly lines.

## Electronics Completes GPS Satellite Control Segment

Electronics Division has completed the control segment for the NAVSTAR Global Positioning System (GPS), a new generation navigation system for the 1980s.

According to George Breitwieser, Electronics' GPS Program Director, checkout and testing of four monitor stations have confirmed that they are ready to accommodate additional satellites in the GPS network.

"The ground station on Guam went on-line last month and locked onto sig-

nals transmitted from orbiting GPS satellites," Mr. Breitwieser said. He pointed out that the signals were then relayed to the master control station at Vandenberg AFB, Calif.

The control segment for GPS is made up of the master control station, an up-load station and four special satellite monitoring stations in Alaska, Hawaii, Guam and Vandenberg.

There are currently three GPS satellites in orbit. The fourth of what is

expected to become a constellation of 24 orbiting GPS satellites was launched last month from Vandenberg atop a General Dynamics-built Atlas-F booster.

The Electronics Division has teamed with Ford Aerospace & Communications Corp. to compete for the full-scale development phase of the NAVSTAR Global Positioning System control segment. Electronics is currently the system developer and integrator for the control and user segments in the GPS

validation phase.

GPS is a new satellite navigation concept being developed for the Air Force's Space and Missile Systems Organization. Applications include en-route navigation for space, air, land and sea travel; air traffic control; photo-mapping and geodetic surveys, as well as precision weapons delivery and other military uses.

GPS is expected to begin operation in the mid-1980s.



# Skills Training Programs Fill GD's Increasing Need

When Quincy Shipbuilding Division took over the Charleston, S.C., facility in 1974 to manufacture the huge cargo spheres for its liquefied natural gas tankers, it was faced with a number of major problems.

One of the most critical problems was the shortage of welders needed to produce the 120-foot-diameter, 850-ton aluminum spheres.

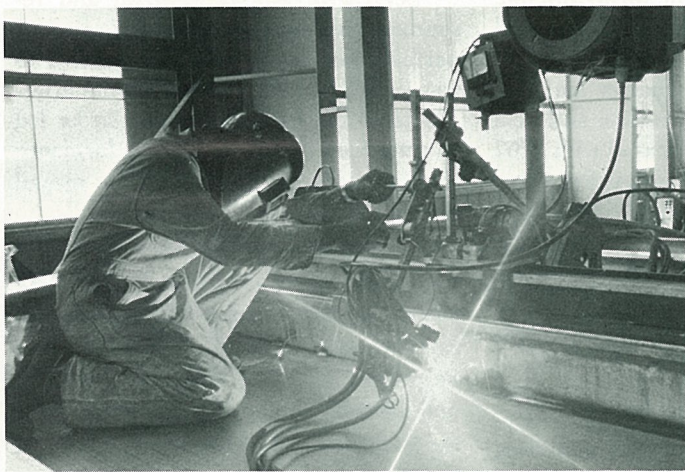
The skills required to weld the spheres together were demanding — each sphere would carry 25,000 cubic meters of liquefied natural gas which had been cooled to a temperature of 265 degrees below zero. The cryogenic cargo demanded that each inch of the 60 miles of welding in each sphere be perfect.

There was a shortage of welders available four years ago at Charleston to perform the job, but 25 spheres now have been delivered to Quincy. Where did Charleston find the skilled welders it needed to do the job? It didn't find them; it trained them.

"So far we have trained more than a thousand welders," says David Malchano, Director of Industrial Relations at Charleston. "Many of the people we hired had worked on farms or in hamburger stands before and had no experience in welding."

"But we put them through a training program, and, after they completed it, they were capable of producing difficult and exacting welds and working with complex welding equipment," he says.

The problem faced by Charleston in 1974 is a familiar one faced by GD divisions and units across the country



A Welder at Charleston

today. The high-technology products of GD require employees skilled in hundreds of job classifications, but skilled employees are not always available in the local area.

As a result, GD spends an estimated \$17 million a year training employees in the latest manufacturing techniques.

Nearly every division has tailored programs to fit its individual needs, and as the corporation and its divisions grow, training programs will increase.

"GD is continually facing important new business opportunities," says Louis M. Whitney, Corporate Manager - Personnel Placement. "Our training programs are going to grow, because we need the skilled employees to meet the challenges."

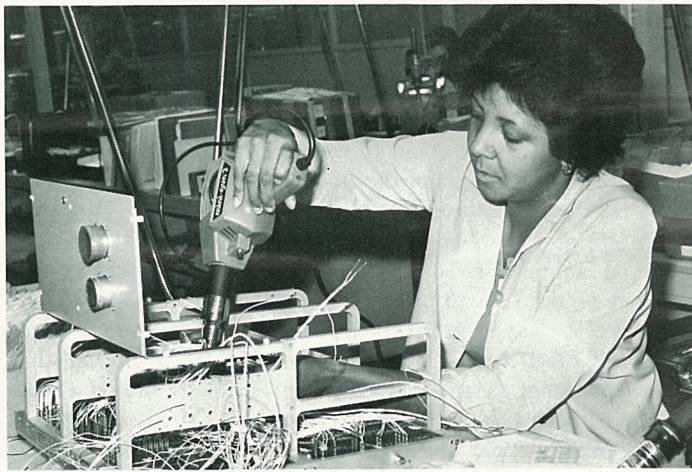
By far the largest training program is at Electric Boat. The primary challenge recently has been to train welders for the submarine programs, and a train-

ing course has produced certified welders in a matter of months.

EB also has classes in pipefitting, machining, carpentry, sheetmetal working and about 20 other areas.

An apprentice at Electric Boat's maintenance pipefitting class enrolls in a program lasting four years, made up of 144 hours of class and the remainder on-the-job training.

Commercial units have their own specialized training programs. For example a person training to be a mine mechanic at Freeman United Coal Mining Co. has a 12-week program alternating between classroom and practical application.



Linda Legan

Extensive skill-training courses are also offered at Fort Worth, Pomona, Convair and Stromberg-Carlson. At Fort Worth, for instance, manufacture of the F-16 fighter has posed a major challenge, and Fort Worth has put more than 100,000 man-hours this year alone into training.

Linda Legan, 28, is a recent graduate of a basic electronics course at Fort Worth Division.

"I used to work at a grocery checkout counter," Mrs. Legan says. "Now I work wiring part of the head-up display for the F-16."

"There was no future for me at the checkout counter — now I have a future, a real future."

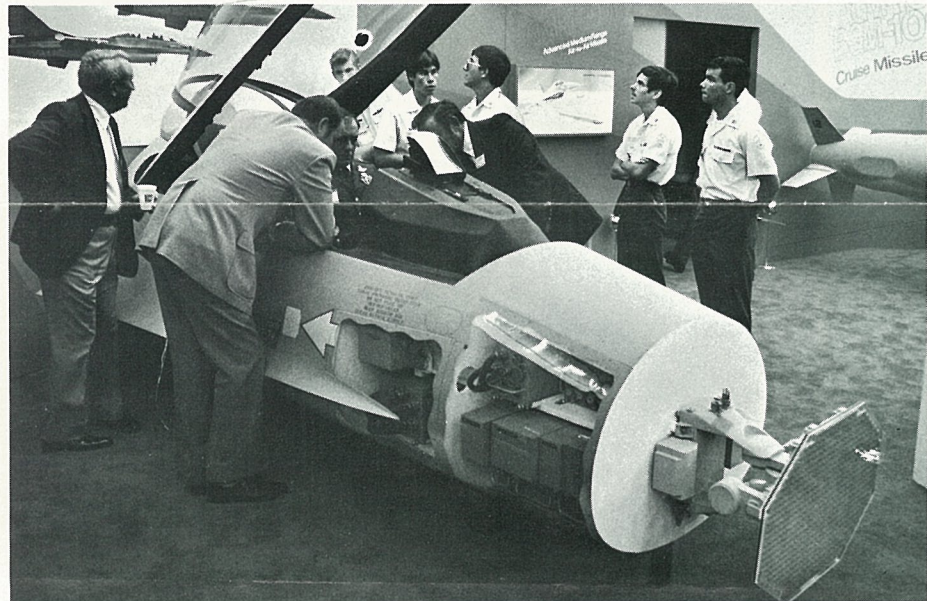


Photo by Tom Rule

**Cockpit Check.** Neil Anderson, GD's Chief F-16 Test Pilot (back to camera), explains the arrangement of the F-16 cockpit to an Air Force officer during the Air Force Association National Convention which was held in Washington D.C. Sept. 17-21. Delegates to the convention toured the GD exhibit which featured mockups of the F-16 cockpit, the Advanced Medium Range Air-to-Air Missile, the AGM-109 and BGM-109 cruise missile and other products.

## National Merit Exams to Be Given In October

Each year, General Dynamics awards up to six four-year scholarships to outstanding children of its employees. Two programs — the National Merit Scholarship and the National Achievement Scholarship — afford students the recognition they deserve and a chance for GD to obtain support for higher education through grants.

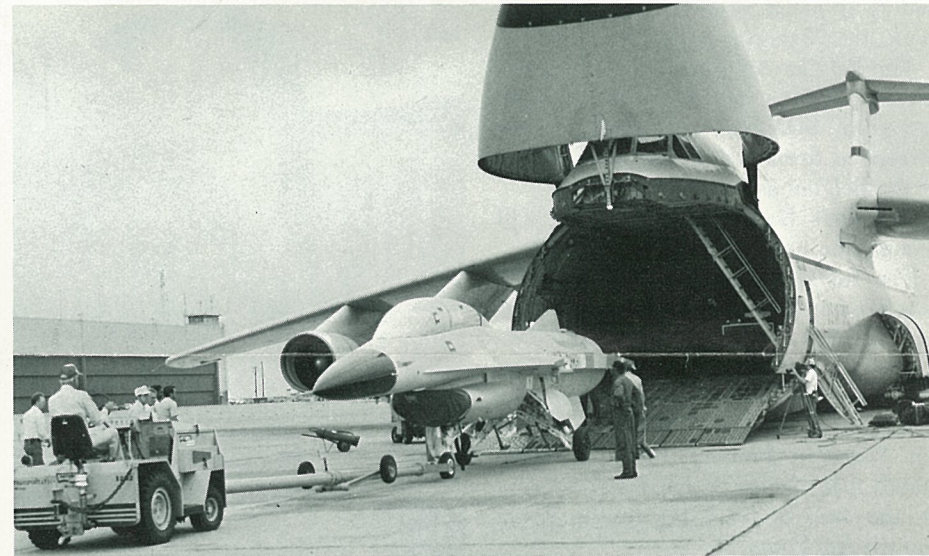
The renewable National Merit Scholarship provides a maximum of \$3,000

per year for up to four years in any chosen field. The National Achievement Scholarship, however, is specifically designed for students in a study program related to business or engineering.

Parents of high school juniors who are interested in competing for a General Dynamics National Merit or Achievement Scholarship should insure the students take the preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test.

The test, administered by the National Merit Scholarship Corp., is given through high schools in all 50 states during October. Students interested in receiving a college scholarship and who will be entering college in 1980, should contact their high school counselors and arrange to take the preliminary test this October. Semifinalists from this test will be tested again next fall.

More details regarding the GD Merit Scholarship Program may be obtained from the Industrial Relations office at each GD location.



An F-16 Heads for Final Assembly in Europe

## Fort Worth's Traffic Department Keeps F-16 Parts Moving to Europe

By Chris Cascella

Some of the terms used at Fort Worth Division would seem to have nothing to do with the F-16 Multinational Coproduction Program. Employees in the Traffic Department refer to "fast-paks," "star-paks," and "colors of the week."

The Traffic Department connects Fort Worth with firms in Belgium, Denmark, the Netherlands and Norway that are members of the program, and it is responsible for packing and shipping F-16 parts and supplies so they arrive safely in Europe.

Under the F-16 coproduction program, the F-16s made in Europe will contain parts manufactured in the United States.

In addition, Fort Worth is responsible for shipping parts and supplies to Hill AFB, Utah, where the first U.S. Air Force wing that will fly F-16s is being organized.

"Our partners in the coproduction program want their parts and supplies as soon as we can get them there," says Tom Jones, Chief of Traffic.

"This program is on a tight schedule, and, if we don't get our parts out on time, a production line in Europe could be held up," he says.

The present program requirements mean that the Fort Worth Traffic Department's employees will ship 7.5 million cubic feet of packed parts in 16,000 shipments to the four coproduction partners in Europe.

"That volume is the equivalent of a football field stacked 165 feet high with freight," says Mr. Jones.

Smaller parts, such as hand tools, circuit boards and rivets, are wrapped in plastic and tucked between two rectangular layers of styrofoam. These are called "fast-paks" (in the shape of honeycombs) or star-shaped "star-paks." The styrofoam slides into tightly fitting boxes.

The boxes are packed in larger cardboard or wooden boxes for shipment.

Large parts are shipped in their own crates, and the Traffic Department employees are experts at designing packages for oddly shaped F-16 parts to insure safe arrival. The sturdy crates they build sometimes will last for many years and will be used for a number of shipments.

"Our boxmakers find ways of doing unusual things with cardboard and wood," says Jones. "They have to be puzzle experts, and anyone who says they have an easy job would be making a mistake."

Each box destined for overseas shipment is marked with a colored tag. The colors are changed each week and help insure that shipments leave for the correct destination.

Larger shipments, such as fuselage sections or even whole F-16s without the wings, are shipped by air in U.S. Air Force cargo planes such as the C-5A.

## Savings and Stock Investment Values

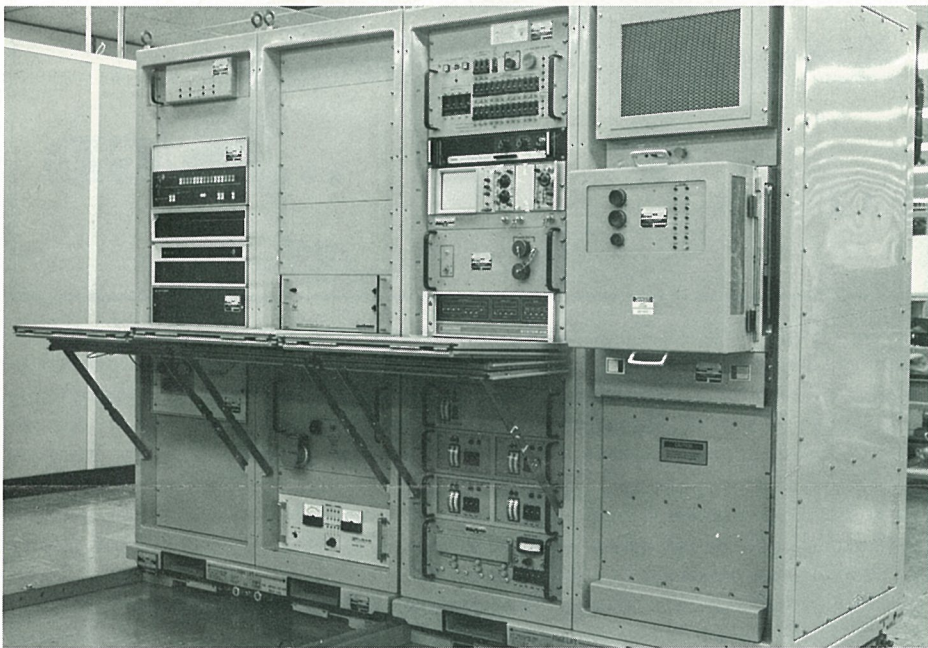
The Stock and Saving Plan unit values in dollars for the month of July are as follows:

Salaried:	
Government Bonds	\$2.0194
Diversified Portfolio	\$1.3300
General Dynamics Stock	\$83.00
Hourly:	
Government Bonds	\$2.0181
Diversified Portfolio	\$1.3602
General Dynamics Stock	\$83.00





**Europe Bound.** Elements of Electronics Division's Stand-Off Target Acquisition System (SOTAS) are loaded aboard giant U.S. Air Force C-5 cargo aircraft in San Diego. SOTAS was deployed to West Germany where it was scheduled to play a role in the Reforger-78 military exercises. In previous maneuvers, SOTAS demonstrated its capabilities for surveillance, target acquisition and command and control under simulated battlefield conditions.



*A Computer Inertial F-16 AIS Station*

## Electronics to Deliver F-16 AIS Station to Fort Worth Division

Electronics Division this month will complete delivery of the first set of production automatic test stations for the F-16 multirole fighter.

The first of four stations, which are a major portion of the F-16's Avionics Intermediate Shop (AIS), was shipped in September to the Fort Worth Division. The other three units are expected to be delivered by the end of October.

"Delivery of elements for the first

shop is our first major production milestone since contract go-ahead was authorized last year," said John Currier, Electronics Deputy Director for AIS.

Mr. Currier said AIS is an avionics maintenance and test facility which will be located close to the aircraft flight line. The four test stations provided by Electronics Division will be able to automatically test and analyze the avionics system of the aircraft.

## Convair Service Awards

### 35 Years

**Research and Engineering:** E. B. Hearn, M. L. Streiff.

**Quality Assurance:** J. M. Leech.

**Operations:** C. L. Walden, G. R. Shirey.

**Launch Vehicle Programs:** E. M. Van Huss.

**Finance:** D. M. Howser.

**Material:** M. G. Tambornino.

### 30 Years

**Operations:** W. W. Sundstrom, A.

M. Barlow, F. L. Stingley, P. G. Biebedorf, L. Carvey Jr., W. R. Killeaney, A. E. Montgomery, L. P. Rose, H. E. Collins.

**Material:** R. Niski.

**Research and Engineering:** L. M. Goodloe.

**Industrial Relations:** A. C. Sutherlin.

### 25 Years

**Operations:** J. W. Taylor, J. R. Zak, H. R. Peters, M. E. Long, I. B. Thornton, H. L. Knapp, B. L. Gammon, J. B. Williams, J. E. Sanders, E. F. Madden, N. Henderson, C. F. Jessup.

**Material:** V. J. Barber.

**Finance:** V. L. Woll.

**Research and Engineering:** D. D. Stenger, B. J. Upton, E. E. Lindgren, D. E. Risty, W. J. Riney, W. G. Hardy, J. W. Coddou, E. Koester, R. C. Zuranski.

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L. Christine Cascella — Associate Writer  
Jack Isabel — Contributing editor, Convair Edition

## Two Air Force EWI Officers Broaden Careers at Convair

Two U.S. Air Force officers have reported to Convair Division to begin a 10-month course in the Air Force Institute of Technology's "Education with Industry" (EWI) program.

Maj. James O. Strickland and 1st Lt. Lana D. Perkins began their EWI assignment last month with a general overview of General Dynamics and Convair organization as well as briefings on hardware developments, such as cruise missile, Atlas, Centaur, DC-10 and KC-10A.

Supported by all major aerospace firms, the EWI program provides industrial management training for selected Air Force career officers. At Convair, the program is administered by Everett Lindem of Educational Services.

According to Mr. Lindem, this is the 22d consecutive year that Convair has participated in the EWI program. The most recent graduates are Capt. Perry Koch, who was reassigned to Hill AFB, Ogden, Utah, and Capt. Karl Zukaitis, who reported to the Air Force Weapons Laboratory, Albuquerque, N. M.

Maj. Strickland reports from the Air Force Inspector General's branch office at Norton AFB, Calif. Previous assign-

ments include attending the Air Command and Staff College, Combat Crew Training School Instructor for the Strategic Air Command, and B-52 navigator. He flew more than 250 combat missions in Southeast Asia. A native of Pembroke, Georgia, Maj. Strickland was graduated from Florida Southern College in 1966 with a Bachelor of Science in mathematics.

Lt. Perkins joins Convair from a tactical airlift wing stationed at the Royal Air Force Base in Mildenhall, England, where she was the base disbursing agent. Her previous Air Force assignments include the Accounting & Finance office and the Commercial Services & Materials office at RAF Lakenheath, England. She also served as Deputy Accounting & Finance Officer at McConnell AFB, Kansas. Lt. Perkins is from Campbellsville, Ky. She earned a Bachelor of Science degree at Western Kentucky University in 1972 and was graduated there with an M.B.A. in 1974.

Both Maj. Strickland and Lt. Perkins will soon have new ranks. Maj. Strickland has been selected for promotion to lieutenant colonel, and Lt. Perkins expects her captain's bars in November.



*'The Boat'*

## EB Raft Leaves Navy Behind

*By Jim Reyburn*

If one certainty emerged from the Second Annual Flotsam and Jetsam Race in the Thames River off Groton on September 3d, it was that Electric Boat Division not only builds the best submarines, but also the best rafts.

EB's catamaran-like entry, aptly named 'The Boat,' caught four challenging Navy entries with their periscopes down and left a field of 29 other contestants in its wake at the lighthearted event. The Marine Commerce and Development Committee of New London sponsored the race to boost waterfront activity.

A good number of the 5,000 spectators on hand, afloat and ashore, were EB employees and their families. They came to see how their team would fare against the Navy, which, weeks earlier, had accepted an EB challenge to compete.

From the starting gun, 'The Boat,' its 14-member crew displaying the highest form of teamwork, muscle power and

spirit, jumped into the lead and never gave it up, pulling across the finish line of the half-mile course more than 200 yards ahead of the nearest competitor.

Rules of raft construction made the race unique. Material cost was limited to \$50 and no one could use screws or nails. EB's raft material cost \$49.09 and it was bolted and glued together.

Light and fast, 'The Boat' was constructed of two 20-foot polyurethane pontoons bridged by a 3/4-inch plywood deck. A mast fashioned from an old flagpole supporting a large gaff-rigged sail completed the rig.

Prerace activity was sheer, unadulterated bedlam. It began at midmorning at New London's City Pier, where the 75 rafts in two categories — individual and corporate — had gathered for some good old-fashioned shenanigans. Crews pelted each other with water balloons and swapped challenges and jokes in a rollicking spirit of merriment and good humor.



# Phalanx Production For Navy Begins at Pomona

The Phalanx close-in gun defense system, developed for the U.S. Navy by Pomona, is now entering production, and the division has been hard at work preparing for the program, according to Pat Thacker, Assistant Program Director.

"The Phalanx system is greater in complexity and larger than anything we've ever produced at Pomona," Mr. Thacker said. "The production systems provide the challenge for continued demonstration of the performance and reliability associated with Phalanx."

In addition to significant rearrangement and installation of main Phalanx manufacturing operations at Pomona, support will come from the newly acquired Abilene, Tex., facility which will provide machining of large parts, and the Camden, Ark., facility which will make harnesses and circuit card assemblies.

Anton Toy, Director of Procurement, said, "The Phalanx initial production program represents a real procurement challenge. It is a first for this division in many ways, including the large number of unique parts and components required. Many of these items are new, and more than 200 new suppliers are being introduced. Obviously, our goal is

to obtain these thousands of items in a timely manner and within budget."

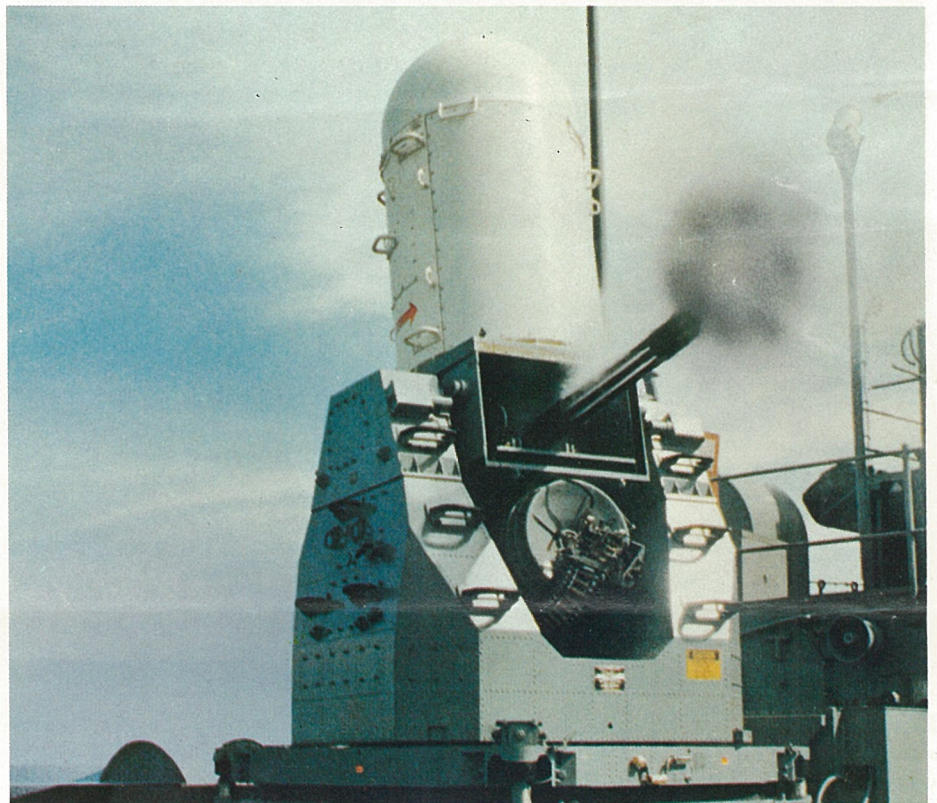
A \$30 million test and tooling contract was awarded for Phalanx apart from the main production contract. The test and tooling contract laid the groundwork for still another unique feature related to the program, according to Barney Chambers, Project Engineer for Manufacturing and Assembly.

"The test and tooling contract was provided in 1977 year monies and preceded our production contract by one year. This enabled us to develop our cost and schedule tracking systems in a very effective manner. Our management information system represents the state-of-the-art, and we have assigned a value to each and every tool required for the fabrication of the Phalanx system," he said.

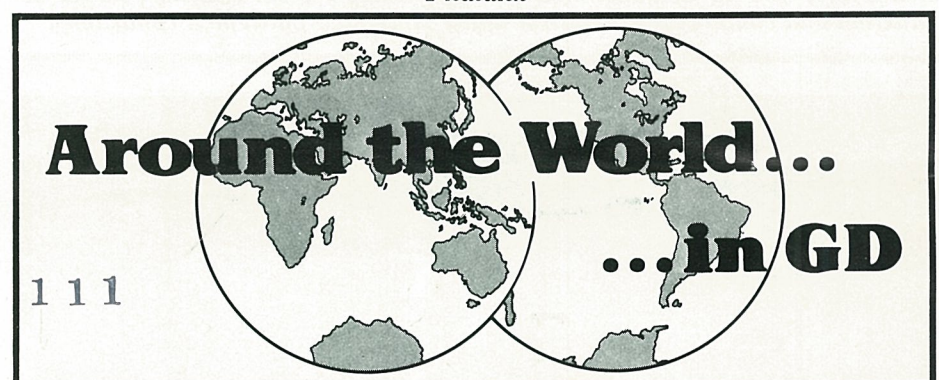
"All tooling tasks have been identified for the production of four Phalanx units per month. However, that data base can be expanded with minimum difficulty to increase production significantly," he added.

The Navy approved the construction of a complete Phalanx weapons test and final acceptance station earlier this year.

Harry Devenport, Senior Facilities Specialist, said construction began early in August.



Phalanx



## Intense Computer Software Course Broadens Engineers' Knowledge<sup>16</sup>

Forty-eight Fort Worth Division aerospace engineers have made a midcareer change and are taking an intensive professional course in computer software which began Sept. 5th.

In addition, more than 100 engineers on the West Coast, from Convair, Electronics, DatagraphiX and Pomona, have made a similar career change and began taking a similar intensive computer software course on Oct. 2.

On the East Coast, a course is being planned for personnel at Electric Boat and Stromberg-Carlson.

The engineers, whose educational background goes all the way up to the doctoral level, have enrolled for the three- or four-month programs which cover

digital computer concepts, computer components, computer language and structuring a computer program. The course includes both classroom work and actual operation of computers.

"GD is a high-technology corporation at the leading edge of a number of fields," says Don H. Huckaby, Director of the Central Data Systems Center at Fort Worth. "Many of our programs have computers in them or are produced with computers."

"Having people who are up on the most advanced developments in their areas of engineering broaden their skills by making a career change into the software field is vitally important," he says.

## Convair Receives Minority Award

Convair Division has received the National Award of Excellence from the U.S. Commerce Department's Office of Minority Business Enterprise.

The award was given to Dr. L. F. Buchanan, Convair Division General Manager, by Dr. Randolph Blackwell, Director of the Office of Minority Business Enterprise, at a Sept. 21st luncheon. The honor reflects excellence and recognizes the role of American corporations with outstanding records of support for minority business enterprise goals of the United States.

More than 100 representatives from government and industry plus several key elected officials heard Dr. Blackwell praise Convair for its strong record of support of minority business in the San Diego area.

"I think this award has special

significance to the San Diego community because it is in the border cities where we are compelled to look in a most social way to minority enterprises," he said.

"General Dynamics is, as a corporate entity, sensitive to these minority business enterprises."

In accepting the honor, Dr. Buchanan said, "We are dependent on small business day in and day out for parts and sub-systems, and our commitment from top management encourages support of minority business enterprises."

He pointed out that this support included motivation and incentive programs developed by Convair for buyer recognition. Convair has special quarterly awards for buyers who place the most purchase orders as well as the most dollars with minority firms.

## Three More Airlines Order DC-10s

Three airlines have placed orders or converted options for McDonnell Douglas Corp. DC-10 wide-bodied tri-jets in recent weeks.

British Caledonian Airways (BCAL) placed an order for three DC-10s with delivery scheduled for the spring and fall of 1980 and the spring of 1981. BCAL currently operates two long-range DC-10s and has two more on order.

In addition, Singapore Airlines Ltd. has converted two options into orders for a total of seven DC-10s on order.

Finally, Laker Airways Ltd. announced

plans to purchase five DC-10s which, when delivered, would bring the non-scheduled carrier's total of DC-10s to 11.

Convair Division in San Diego fabricates the major portion of the DC-10 airframe under subcontract from McDonnell Douglas. Through September, the division had delivered 279 fuselages, and current production stands at 2.5 per month.

As of Sept. 27th, 256 DC-10s have been delivered, 48 more are on firm order and conditional orders or options have been placed for 41 more.

**At CHQ:** William W. McCurdy transferred from Fort Worth and was promoted to Corporate Director of Pricing . . . E. Douglas Hudson was promoted to Corporate Manager of Financial Plans and Reports . . . Noble N. Tombaugh was promoted to Corporate Manager of Financial Planning - Commercial . . . Ronald N. St. Sauveur, Larry J. Sekel and David B. Bedard joined as Internal Auditors . . . Paul H. Davis joined as Corporate Manager, Industrial Engineering . . . F. James Dietz was named Corporate Manager, Financial Planning - Aerospace . . . Stephen J. Lawrence joined as Supervising Senior Auditor . . . Margaret A. Schier was promoted to Corporate Tax Representative.

**At Convair:** S. E. Aldridge was promoted to Program Engineering Manager . . . M. G. D'Annunzio was promoted to Group Engineer . . . D. E. English and F. S. Mascari were promoted to Manager of Finance . . . M. L. Male was promoted to Engineering Chief - Test & Evaluation . . . R. Mendoza was promoted to Manager-Employee Services . . . W. D. Reeder and A. B. Walburn were promoted to Group Engineer . . . R. C. Ring was promoted to Engineering Chief - Operations Analysis . . . A. H. Ryan was named Project Engineer Senior . . . L. F. Wiekum was promoted to Engineer Chief - Systems Integration . . . M. Winkler was promoted to Program Engineering Chief - Avionics . . . A. B. Yanke was promoted to Engineering Chief - Data Requirements and Evaluation . . . Robert L. Robbins transferred from St. Louis as Marketing Manager . . . Daniel Sarokon was named Manager - Base Operations - Eastern Test Range . . . C. K. Anderson transferred from Electronics and was named Director of Marketing . . . Keith T. Kedward was promoted to Engineering Chief . . . Harold Lee was promoted to Cruise Missile Operations Director . . . Dennis M. Sealey was named Engineering Chief . . . Robert M. Bowman joined as Engineering Manager . . . George Christiansen joined as Director - Marketing (Advanced Projects) . . . Herbert H. Lenzkes transferred from Pomona as Engineering Chief of Advanced Systems . . . William H. Lowe was named Engineering Chief Systems Verification . . . Robert Wintersdorff joined as Senior Project Engineer.

**At Pomona:** Alex B. Armstrong joined as Engineering Specialist . . . Rodney L. Powell joined as Engineering Staff Specialist . . . Herbert B. Brooks joined as Design Specialist . . . Robert L. Hallse joined as Staff Scientist - Senior . . . Michael A. Leone joined as Section Head . . . George C. McKoy joined as Engineering Staff Specialist . . . Jerry L. Watkins transferred from St. Louis to Camden as Plant Controller . . . C. E. Bealer was promoted to Manager - Cost Control . . . R. D. Connell was promoted to Assistant Program Director . . . J. L. Dossi was promoted to Project Engineer . . . R. W. Hadinger was promoted to Manager Long Range Facility Planning . . . J. Halliday was promoted to Group Engineer . . . R. T. Kathman was promoted to Section Head . . . C. A. Leonard and J. E. Morgan were promoted to Project Engineer . . . C. Snyder Jr. was named Assistant Program Director . . . L. B. Smith was promoted to Program Director . . . E. C. Thompson was promoted to Assistant Program Director.

**At Electric Boat:** Donald Steamer was named Chief Engineer of Engineering Services . . . W. Budding was promoted to Manager of Engineering . . . G. Fagan was promoted to Chief of Engineering . . . W. Magro was promoted to Manager - Trident Ship . . . P. Mazzella was promoted to Manager - Material Program and Control.

**At Electronics:** Robert M. Georgevic joined as Engineering Specialist . . . Robert C. Bieger joined as Program Manager.

**At Fort Worth:** William M. Evans was promoted to Project Manager.

**At DatagraphiX:** J. R. Malis was promoted to National Service Manager.

**At GD Credit Corp.:** Creighton B. Collins has been named Collection Manager.

**At DSS:** Robert J. DeLargy has been named Controller . . . Richard W. Cress joined Western Data Systems Center as Software Engineering Specialist . . . John W. Withers joined as Corporate-Wide Applications Specialist.



# SOTAS Shows Responsiveness In REFORGER Exercise

By Jack Isabel

At the Division Tactical Operations Center of the Orange Force, troop movement of Blue Force elements is suspected in a forward area. The Division Commander scrambles a specially-equipped radar helicopter which stands a safe distance from the forward edge of the battle area while sending moving target data to a command trailer on the Orange side. There, target data are displayed, processed and given to the Tactical Operations Center for necessary action.

This battlefield scenario happened time and time again during the successful demonstration of the Electronics Division-built Standoff Target Acquisition System (SOTAS) during the REFORGER '78 exercises in West Germany in September.

"SOTAS flew 65 missions during the 10-day exercises," said Bob Baker,

SOTAS Program Manager. The missions were carried out around the clock in good and bad weather. Baker said 48 of the missions were made while the helicopters were operating under Instrument Flight Rule conditions.

"We feel that SOTAS was very responsive to mission assignments in locating, tracking and monitoring Blue Force targets under all conditions," Mr. Baker said. "We think that it did the job well and that the Army has the same opinion."

REFORGER is a North Atlantic Treaty Organization combat exercise. It involves massive deployment of troops and equipment to Germany. According to Baker, this is the third consecutive REFORGER at which SOTAS has been put through its paces.

Electronics shipped the SOTAS display trailer and two radar-carrying heli-

copters to Germany in August. Baker and a 15-man support team from Electronics spent two weeks checking out the system and training Army personnel. The SOTAS was then turned over to the First SOTAS Detachment of the Third Armored Division. A second system, which will be delivered in December, will go to the Second SOTAS Detachment of the First Armored Division.

Baker said the Orange and Blue Forces in REFORGER '78 operated in an area from the Fulda Gap region to the outskirts of Frankfurt.

"The SOTAS Detachment made three tactical moves during the exercise and each time was set up and operating within 20 minutes," Baker said.

Essentially the helicopter flies a stand-off course on the friendly side of the forward edge of the battle area. The stabilized antenna mounted below the fuse-

lage is normally scanned over a 120-degree sector. Returns from moving targets are digitally processed in the helicopter and then sent to the display van over a microwave data link.

The van houses displays, computers, map and plotting boards and communication equipment. Composite data from the helicopter are computer processed for the near real-time display of moving targets on two side-by-side consoles. Location, number, velocity and direction of these moving targets can be quickly extracted from the imagery by the console operators.

According to Baker, the SOTAS units in Germany are advanced development models and will remain there for three years until engineering development models become available. He said SOTAS will participate in a winter REFORGER scheduled for early next year.

## GD World

Vol. 8 No. 8

3

November 1978

### Inside the World

YF-16 Drops Laser-Guided Bombs . . . . . Page 2

GDCC — A Leader in Its Industry . . . . . Page 4

## Electronics Delivers First AIS to Air Force

Electronics Division has delivered the first production Avionics Intermediate Shop (AIS) for the F-16 Multirole Fighter.

The AIS is a set of comprehensive maintenance and test equipment which will be located close to the flight line on F-16 bases. It consists of four test stations which automatically check and analyze the avionics systems of the F-16.

In delivery ceremonies in San Diego, Lt. Gen. George H. Sylvester, Commander of the Aeronautical Systems Division (ASD), Air Force Systems Command, said, "The AIS is the single most important piece of F-16 support equipment and is crucial to maintaining the aircraft."

He pointed out that the Air Force has long since learned that support equipment is sometimes more important than the aircraft itself.

"The AIS," he said, "is essential because no aircraft is a weapons system without its avionics."

James M. Beggs, GD Executive Vice President - Aerospace, commended the AIS production team which was among the more than 500 onlookers on hand for the delivery ceremony.

"This is a happy day for us. We are

delivering the first of a new series of automatic test equipment which is the best in the world," Mr. Beggs said.

He also said the AIS can do jobs other test equipment cannot do, emphasizing that the Electronics-built units are more versatile, more flexible and more reliable than previous generation equipment.

"All the long hours that went into bringing forward what you see here,

have to a large extent been compensated," Beggs said.

"We must now devote ourselves to putting forth an even stronger effort to meet the challenges of delivering one shop a month," he said.

Also participating in the delivery were: Frank O. Chesus, Electronics Division General Manager; Herbert E. Jordan, Electronics Vice President and Program Director for AIS, and Herbert F.

Rogers, Fort Worth Deputy General Manager and F-16 Program Director.

Others on hand included: Brig. Gen. Davis Rohr, Commander, 388th Tactical Fighter Wing, Hill AFB, Utah; Maj. Glenn R. Seeley, Defense Contract Administrative Services, Plant Representatives Office; Maj. Paul O'Connor, ASD; Lester Crown, President of Material Service Corp.; Richard E. Adams, Fort Worth General Manager, and Dr. Leonard F. Buchanan, Convair General Manager.

The four production stations are designed to check radio frequency devices, computer and inertial equipment, displays and indicators and pneumatic devices.

Current requirements call for Electronics to produce and deliver 144 production stations which make up 36 shops, with production follow-on options for additional shops. Two shops will maintain a wing of F-16 fighters.

Orders for the General Dynamics-built F-16 total 1,971. The U.S. Air Force has ordered 1,388. Four North Atlantic Treaty Organization countries — Denmark, the Netherlands, Belgium and Norway — are coproducing F16s and have ordered 348, while Iran plans to buy 160 and Israel 75.

### Tomahawk Completes Flight Ending Survivability Tests

A Convair-built U.S. Navy Tomahawk cruise missile flew hundreds of miles against detection and acquisition components in the seventh, and last, engineering development survivability test on Oct. 30th.

The missile was launched from under the wing of a Navy A-6 aircraft at the Pacific Missile Center, Pt. Mugu, Calif.

The series of survivability tests was designed to determine under what specific circumstances, if any, a cruise missile might be vulnerable to detection and acquisition systems. Data collected during the initial series will be used in planning future tests, in assessing performance requirements for cruise missiles and in deciding if any design change is necessary before production begins.

During the entire Tomahawk flight test program, the missile has flown 27 successful flights and two partially successful flights.

## S-C Quickly Restores Wrecked Phone System

A derailed caboose crashing into a Continental Telephone Co. of the Northwest building in Washington brought a quick response by Stromberg-Carlson personnel to restore telephone service to 4,200 subscribers.

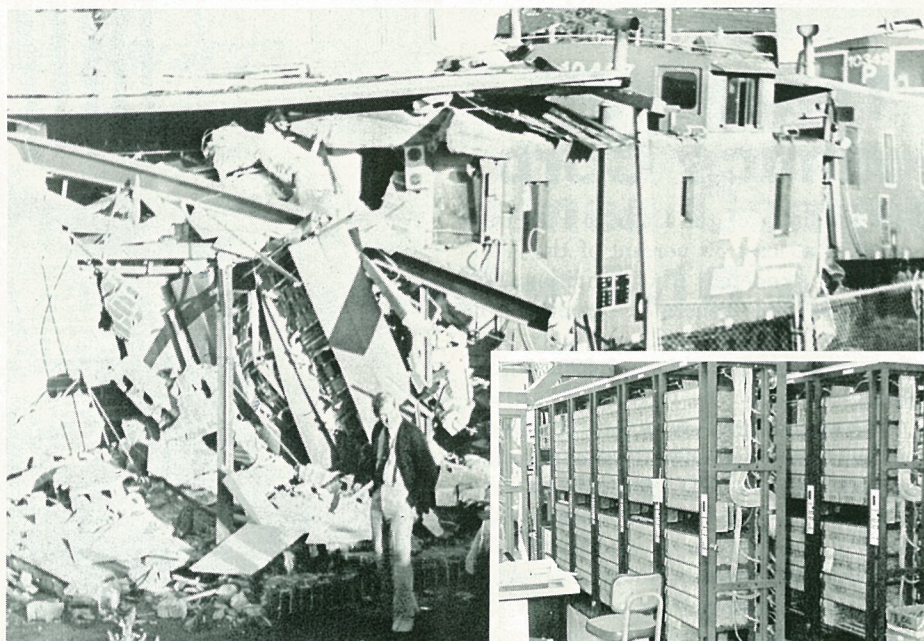
The accident, which occurred on Sept. 15th, left telephone subscribers in the Ferndale, Wash., area without service, but S-C located and diverted a System CENTURY® digital central office (DCO) that was being shipped to Newport, Mich., and rerouted it to Ferndale.

The DCO arrived in Ferndale on Sept. 23d, power was applied to it the following day and the first test call was made on Sept. 28th.

Service to the Ferndale customers was restored 35 days after the accident.

"We were very lucky because the system we were shipping to Michigan had already been engineered and built in a configuration that was needed in Ferndale," says Dave Haverty, S-C's West Coast Installation Manager.

"A typical order for a central telephone office can take one and a half years to complete. First, the sales con-



**Quick Recovery.** When a derailed caboose crashed into a Continental Telephone building in Ferndale, Wash., the damage cut off service to 4,200 telephone subscribers. Stromberg-Carlson restored service in 35 days with a new System CENTURY digital central office (inset).

tract must be completed and then the system must be designed and built. This lead time was avoided because the DCO

we had already on the road headed for Michigan was similar to what we needed in Washington."

Frederick F. Jenny, S-C President, said, "We were certainly fortunate to have had a DCO available, but the superior teamwork and follow-through by everyone who participated at Ferndale were the fundamental factors in the overall success of the installation and cutover."

The train accident had damaged Ferndale's one-year-old Stromberg-Carlson ESC1-PL2 switching system beyond repair.

Continental borrowed emergency equipment from other companies to restore limited service to the area while the DCO could be shipped and installed.

After the train accident, S-C assembled a team to handle the installation. The team included: Haverty, Jack Martin, Dewey Haney, Bill Stigall, Tom Bowman, Larry Weiser, Harold Brackett, Jim Hachadorian, Pat Kelly, John Caruth, Walt Olmstead, Ernie Smart, Dennis McVey, Scott Beaumont, John Manning, Bill Sisneros, Dan Gerth, Ken Staudt, Mike Nosel, Carlo Janotti and Dave Maine.



# YF-16 Scores Hits With Laser-Guided Weapons

A single-seat prototype YF-16 equipped with an ATLIS II weapons guidance pod recently scored hits on ground targets with laser-guided bombs during an industry-sponsored precision strike test program.

During the course of the 46-flight program, the U.S. Air Force/General Dynamics YF-16 prototype became the first single-place fighter to achieve accurate, unassisted deliveries of laser-guided weapons.

The successful tests flown from Edwards AFB, Calif., demonstrated the single-seat F-16's capability as a self-sufficient precision strike fighter.

Significant groundwork preceded the flight test phase of the program, including wind tunnel tests, simulation studies, software development, aircraft modifications and integration of the Martin Marietta ATLIS II pod with the YF-16's avionics system.

The automatic tracking laser illumination system (ATLIS) is equipped with a television system that tracks the target automatically after designation by the pilot, and a laser target illuminator for precision weapon guidance.

During the YF-16 precision strike program, General Dynamics Engineering Test Pilot David Palmer utilized an ATLIS II pod mounted on the lower right side of the YF-16's air inlet.

The ATLIS system typically tracked targets to impact. For the first precision

guided delivery, the GBU-10 laser-guided weapon was released automatically from an altitude of 5,000 feet while the YF-16 prototype was traveling 480 nautical miles an hour. The pilot made a 4-g turn after weapon separation. The GBU-10 followed a laser beam to the target.

The YF-16 precision strike program also involved the delivery of GBU-16 laser-guided bombs, employing U.S. Air Force delivery tactics. Other aspects of the program focused on the use of the ATLIS II in the air-to-air mode, simulated delivery of laser-guided Sabre missiles, and use of a helmet-mounted sight as an additional cueing device in air-to-air and air-to-surface operations.

Five companies contributed to the precision strike joint test program.

- General Dynamics leased the prototype YF-16 from the Air Force and installed the sensors required for the test program.

- The ATLIS II electro-optical pod was supplied by Martin Marietta Corp.

- Texas Instruments provided laser guidance kits for the weapons.

- British Aircraft Corp. provided support for the flight demonstration program and furnished technical data and launch algorithms for its Sabre anti-armor laser guided missiles.

- A helmet-mounted sight system was provided by Polhemus Navigation Sciences, Inc.



A YF-16 Releases a Laser-Guided Weapon

## First F-16 Engine Coproduced By European Firms Is Delivered

European firms have delivered the first coproduced F100 engine for the F-16 Multirole Fighter. It was delivered Sept. 29th by the engine division of Fabrique Nationale of Herstal, Belgium.

F100 engines are being coproduced in Europe in cooperation with the Pratt & Whitney Aircraft Group of United Technologies Corp., which has headquarters in East Hartford, Conn. Pratt & Whitney designed and developed the F100, the world's most advanced operational military jet engine, for the U.S. Air Force.

"The accomplishments of this F100 coproduction engine program have been outstanding — new facilities, machine tools and, more important, people, have been brought together to provide on-schedule module deliveries in May, the first ground test in July and, today, the delivery of the first European-built engine," Harry J. Gray, Chairman of United Technologies, said at the delivery ceremony.

Under an agreement signed in 1975, five NATO allies — Belgium, Denmark, Norway, the Netherlands and the United States — will coproduce the 348 General Dynamics F-16s to be deployed by the European countries. Including spares, 438 engines will be manufactured in

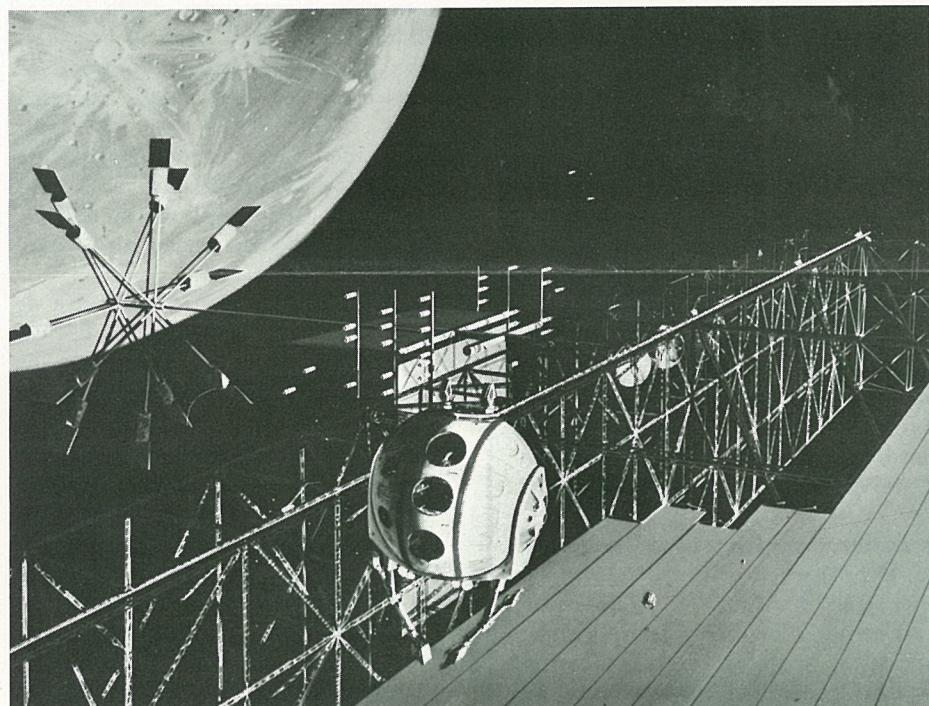
Europe for those fighters.

Industry in each of the European countries has been assigned responsibility for a part of the engines: Fabrique Nationale is fabricating the fan module, the compressor, combustor and compressor-drive turbine, as well as assembling and testing the engines; Dansk Industri Syndikat A/S of Denmark is coproducing the gearbox; N. V. Philips Gloeilampenfabrieken of the Netherlands is providing the augmentor and exhaust nozzle, and Kongsberg Vapenfabrikk A/S of Norway is coproducing the fan-drive turbine. In addition, they will supply parts for engines that will power U.S. Air Force F-16s.

The first coproduced F100 engine was assembled last June in Herstal. Ground tests that begin in July were highly successful, with engine performance exceeding specifications.

At the delivery ceremony, the first coproduced engine was turned over to representatives of Pratt & Whitney Aircraft who, in turn, presented it to a representative of the U.S. Air Force responsible for the program.

The engine will be delivered to SONACA's Gosselies, Belgium plant for installation in the first coproduced F-16.



**Lunar Recovery.** Convair Division is carrying out a National Aeronautics and Space Administration study on in-space construction of future satellites using resources recovered from the moon. The artist's conception depicts fabrication of a very large Earth service satellite which is being made from lunar materials. The sphere (foreground) is a mobile cab for astronauts. Living quarters are located in the propeller-like structure (left rear). Lunar resources which might be recovered include: metals, such as aluminum, titanium and iron; silicon, for solar cells and glass, and oxygen, for propellant and life support.

## ATC Stock Is Tendered To General Dynamics Corp.

General Dynamics announced that approximately 746,000 shares, or about 36 percent of the common stock of American Telecommunications Corporation (ATC), were tendered to General Dynamics in response to an Offer to Purchase which expired on Oct. 12th.

### Savings and Stock Investment Values

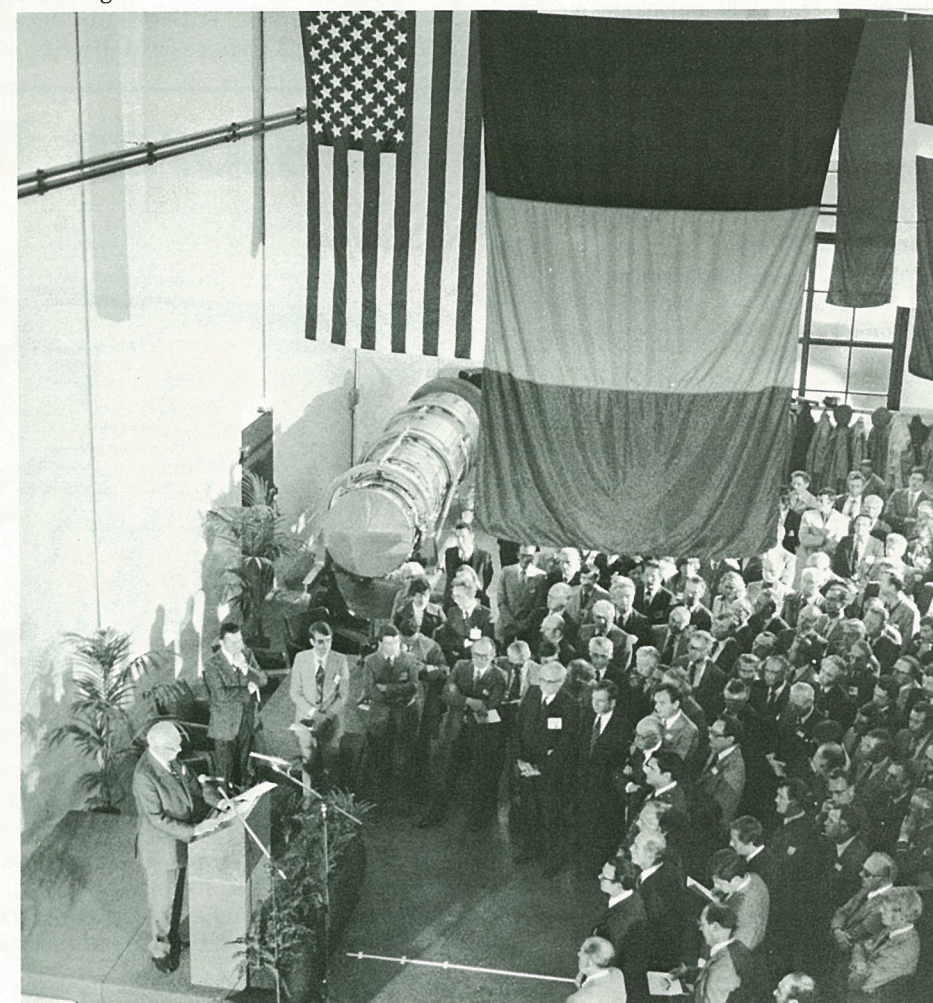
The Stock and Saving Plan unit values in dollars for the month of August are as follows:

<b>Salaried:</b>	
Government Bonds	\$2.0134
Diversified Portfolio	\$1.3732
<b>Hourly:</b>	
Government Bonds	\$2.0304
Diversified Portfolio	\$1.4041
General Dynamics Stock	\$ 85.12

A condition of the Offer to Purchase was that at least 30 percent of the ATC shares be tendered. This condition has been met and General Dynamics will now purchase all of the properly tendered shares at a price of \$23.50 per share.

The tender offer was a part of a merger transaction whereby General Dynamics will acquire ATC through the exchange of one share of ATC stock for .47 share of a new General Dynamics convertible preferred stock for all ATC shares not exchanged for cash.

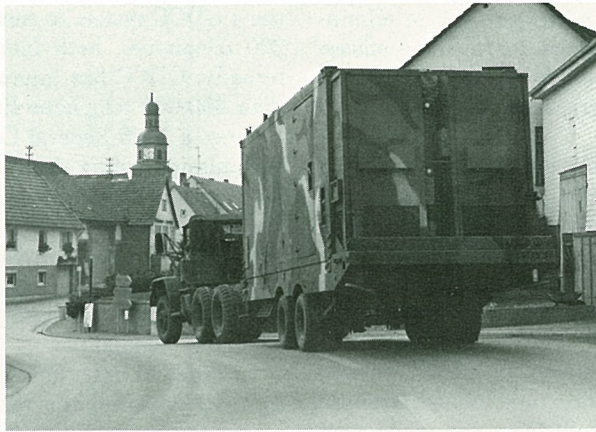
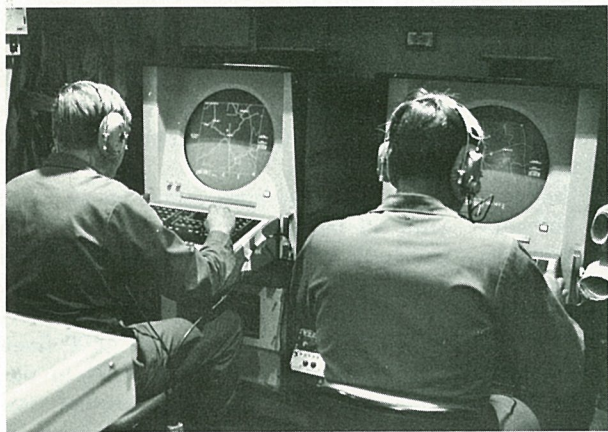
ATC shareholders who did not tender their shares may elect to receive \$23.50 per share at the time the merger is consummated in lieu of receiving the preferred stock, provided that the total number of shares acquired for cash does not exceed 49 percent of the outstanding ATC shares.



The F100 Delivery Ceremony



# SOTAS Participates in Army REFORGER '78



Photos by Bob Montague

**On the Scope.** Radar operators attached to the first SOTAS Detachment view data relayed by a helicopter during REFORGER '78. (See Story Pg. 1.)

**On the Road.** The mobility of the SOTAS system allowed it to be moved to three sites during the military exercise in West Germany.

**On Target.** An officer in the SOTAS trailer checks his display plot using a digital map-board to assist in situation analysis and target location.

## 12,000 Tour Kearny Mesa, Lindbergh Field

More than 12,000 Convair family members and friends poured through the gates at Kearny Mesa and Lindbergh Field during a six-hour open house Oct. 7th.

Visitors had the opportunity to see major Convair products, including the Tomahawk cruise missile, Atlas and Centaur launch vehicles, energy systems and DC-10 fuselage sections. All were supported with graphic display. In addition, 13 major suppliers had exhibits at the open house.

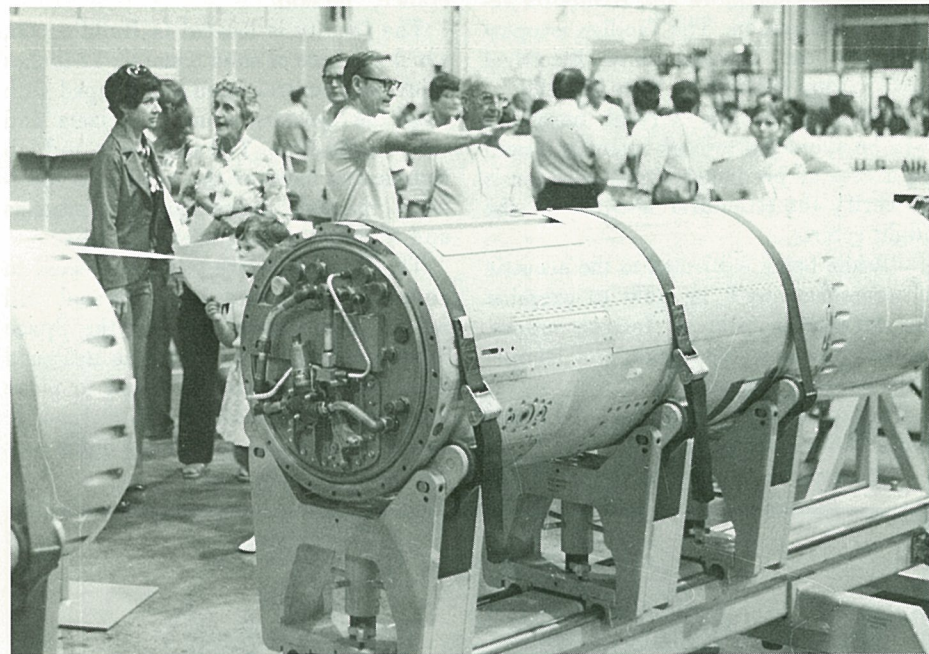
Commenting on the successful day, Dr. Leonard F. Buchanan, Convair General Manager, said, "It was good to see the pride and spirit that employees showed in pointing out our products and facilities to their families and friends."

Many nonemployees expressed interest in joining the General Dynamics team.

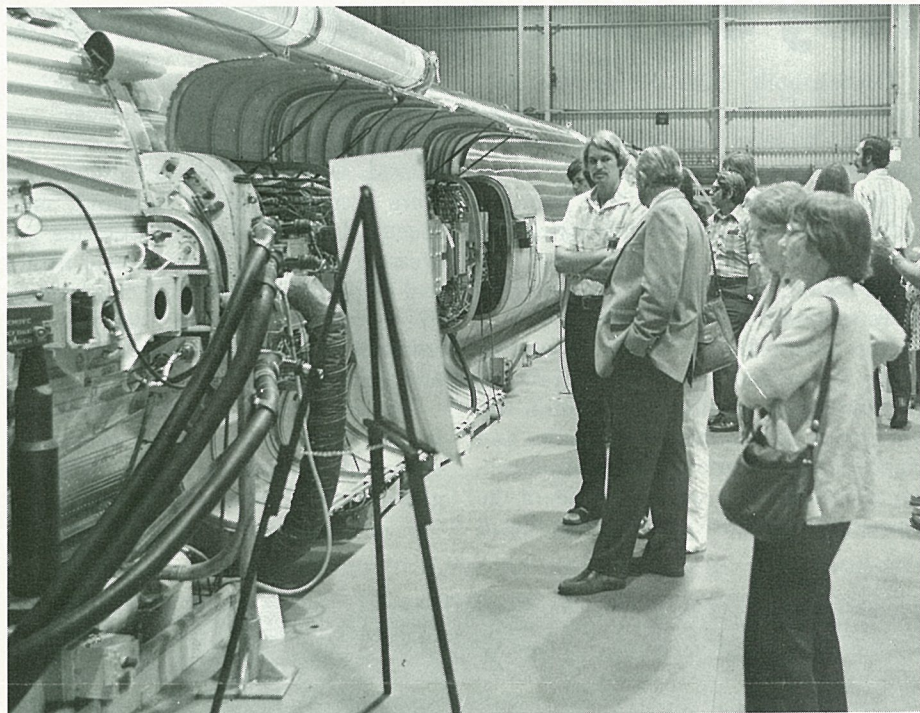
Employment Opportunity Booths distributed nearly 500 applications. Employment representatives conducted nearly 100 in-depth interviews on the spot.

At Kearny Mesa, where nearly 7,500 visited, the key areas included the Atlas and Centaur docks, where the reliable launch combination is assembled, the Tomahawk Cruise Missile assembly area, where an AGM-109 air-launched cruise missile was displayed, and the B-52 mock-up in the cruise missile systems integration lab.

Nearly 4,800 visited the Lindbergh Field Plant. On display there were the giant DC-10 fuselage sections, a Tomahawk and an Atlas and Centaur. The tour route also included a walk-through of the machine shops where precision parts for the Convair products are fabricated.



And discuss Tomahawk design.



Photos by Pete Autio

Visitors to Convair see the Atlas booster

### Convair Service Awards

#### 35 Years

**Operations:** O. L. Carpenter, T. J. Oliver, W. M. LaFleur, G. E. Nuss, A. R. Mooney Jr., E. W. Fenwick.

**Research and Engineering:** R. L. Cox.

#### 30 Years

**Operations:** V. J. Lavis, R. Gann, R. A. Planchon.

**Research and Engineering:** W. J. Hammond, G. L. Austin.

**Data Systems Services:** H. N. Duty, J. K. Gaston.

**Industrial Relations:** L. W. Turner

**Quality Assurance:** W. F. Hageman.

#### 25 Years

**Operations:** C. J. Hebert, R. W. Ballard, C. E. Thornton, E. R. Jones, J. B. Evans, H. G. Craig, R. T. Lewis, L. M. Oldham, C. C. Nash, W. E. Lipert Jr., E. D. Heathman, J. S. Orton, J. S. Scalisi, G. A. Hillis, J. E. Royle.

**Quality Assurance:** R. L. Lucas, C. J. Abernathy, P. C. Godfrey, R. R. Brown, L. G. Menches Jr.

**Research and Engineering:** W. F. Sauer, W. R. Stout, J. E. Stengel.

**Industrial Relations:** C. J. Johnson, M. C. Barnes.

**Marketing:** B. Hom.

### At Electronics

#### 30 Years

M. F. Braley

#### 25 Years

E. R. Rush, L. F. Wilson.

#### 20 Years

L. Ortiz, A. J. Anderson, W. A. McBrayer, G. G. Ragan.



**AIS School.** Test Operator Joey Riturban (seated) and Instructor Jack Mierzwa (standing at left) demonstrate use of the F-16 Automatic Test Equipment manual test station for Standard Electric Kirk A/S representatives Vagn Andersen, Hoedur Halldovsson and Svend Iversen.

## Danes Complete Training For F-16 AIS Coproduction

Three representatives from Standard Electric Kirk A/S of Denmark have completed the first of nine training courses at Electronics Division on Avionics Intermediate Shop (AIS) automatic test equipment for the F-16 multi-role Fighter.

Svend Iversen, Hoedur Halldovsson and Vagn Andersen recently spent two weeks in San Diego as students in the first in a series of coproduction training sessions on the special test equipment.

The courses covered the manufacture and test of complete test stations, elements of the AIS which are being planned for coproduction by the firm in Horsens, Denmark.

About 20 additional representatives from the Danish firm will attend the classes on manufacturing engineering, quality assurance, functional theory of operation, design assurance, test language, self-test software, production test and harness fabrication. The program is planned to run through July 1979.

AIS is a maintenance and test facility which will be located close to F-16 flight lines. Four test stations provided by Electronics are key elements of the shop. The test stations analyze computers, inertial devices, displays and indicators/pneumatic devices and other components of the aircraft's avionics system.

### GD World

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# GDCC — 5 Years Old and an Industry Leader

Though only five years old, General Dynamics Communications Co. is already a leader in the interconnect area of the multibillion dollar telecommunications industry.

"GDCC is already the nation's largest telephone interconnect organization," says Guy W. Fiske, GD Executive Vice President - Commercial. "It could help to bring General Dynamics to the head of the whole independent telecommunications field."

In October, for example, GDCC installed a 2,400-line-capacity CRITERION Switching Node in the New York offices of Metromedia, Inc., a \$300 million independent broadcast and outdoor advertising firm. Metromedia uses its

own communications network to eliminate toll calls between its far-flung offices. The GDCC-installed CRITERION will handle the eastern third of Metromedia's network.

Included in the network design is the capability to meet Metromedia's future requirements for data polling during nonbusiness hours.

To date, 23 locations of this network are serviced by switching systems of GDCC.

The 450 employees of GDCC market, install and service interconnect systems which link the outside commercial telephone lines with a company's or organization's internal telephone system. For example, the 10 or 20 commercial telephone lines going into an office would

use a GDCC system to connect the office's 200 telephones, both internally and externally. GDCC has interconnected more than 400,000 telephone lines.

Since a 1968 Federal Communications Commission ruling determined that non-Bell System equipment could be connected to the Bell lines, many companies have found that purchasing their own interconnect systems was more economical than leasing the equipment from the telephone company.

In order to enter this field, five years ago, GD acquired and merged two small companies — Arcata Communications and United Business Communications. The merged companies were initially called Stromberg-Carlson Communications, Inc., but last year the name was

changed to General Dynamics Communications Co.

"The General Dynamics label has given us added credibility in the marketplace," says William Lombardi, President of GDCC.

GDCC's customers might be an office with 35 telephones, or a hospital with hundreds of beds — each patient room needing its own telephone connection. The hospital might use GDCC's CRITERION which can handle 2,400 lines and can distribute outside calls to patients' rooms, or allow the hospital staff to make calls within the hospital itself. A busy office might need a FOCUS system which can operate 40 to 400 lines, and will put incoming calls on a musical hold until office personnel are free.

## 2 Atlas Boosters Launch Key Satellites into Orbit

Convair-built Atlas F boosters successfully launched two key satellites from the Western Test Range at Vandenberg AFB, Calif., last month.

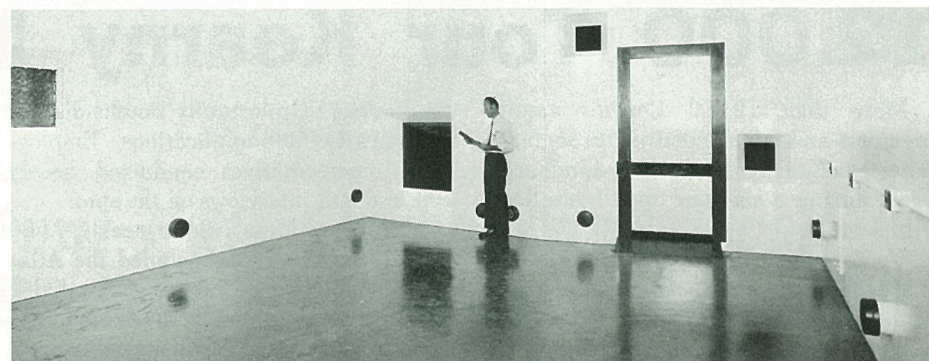
On Oct. 13th Atlas 29F sent the NASA-developed Television Infrared Observation Satellite (TIROS) aloft. A week earlier, NAVSTAR 3 was successfully sent into orbit by Atlas 47F.

The polar-orbiting TIROS spacecraft is the first in a series of new operational meteorological monitoring satellites. According to the National Aeronautics and Space Administration, new environmental monitoring instruments on board the spacecraft should provide significant

technological advances over the current series spacecraft they will replace.

TIROS is expected to provide improved weather analysis resulting in more accurate weather forecasts; more specific location of ocean currents and areas of upwelling, important to fishing and shipping interests and more precise snowcover, snowmelt and rainfall data, essential to water resource management and flood forecasting.

The most recent NAVSTAR launched is the third in a planned operational system of 24 satellites that will circle the globe every 12 hours and beam continuous navigation signals to earth.



Inside Convair's New Acoustic Facility

## Convair Opens Acoustic Center For Testing Structural Integrity

A high-intensity acoustic facility has begun operation at Convair Division's Harbor Drive Test Site.

The new sound center, one of the largest on the West Coast, will be used to support Tomahawk and AGM-109 vehicle qualification. The facility is operated by the Environmental/Electrical Labs Group headed by Don Nirschl.

According to Mr. Nirschl, hardware will be subjected to high-intensity sound in excess of predicted flight noise levels to verify the structural integrity of the flight vehicle.

"While being subjected to the acoustic environment, we'll be able to examine for structural failures, fatigue cracks, broken electrical harnesses and component failures," he said.

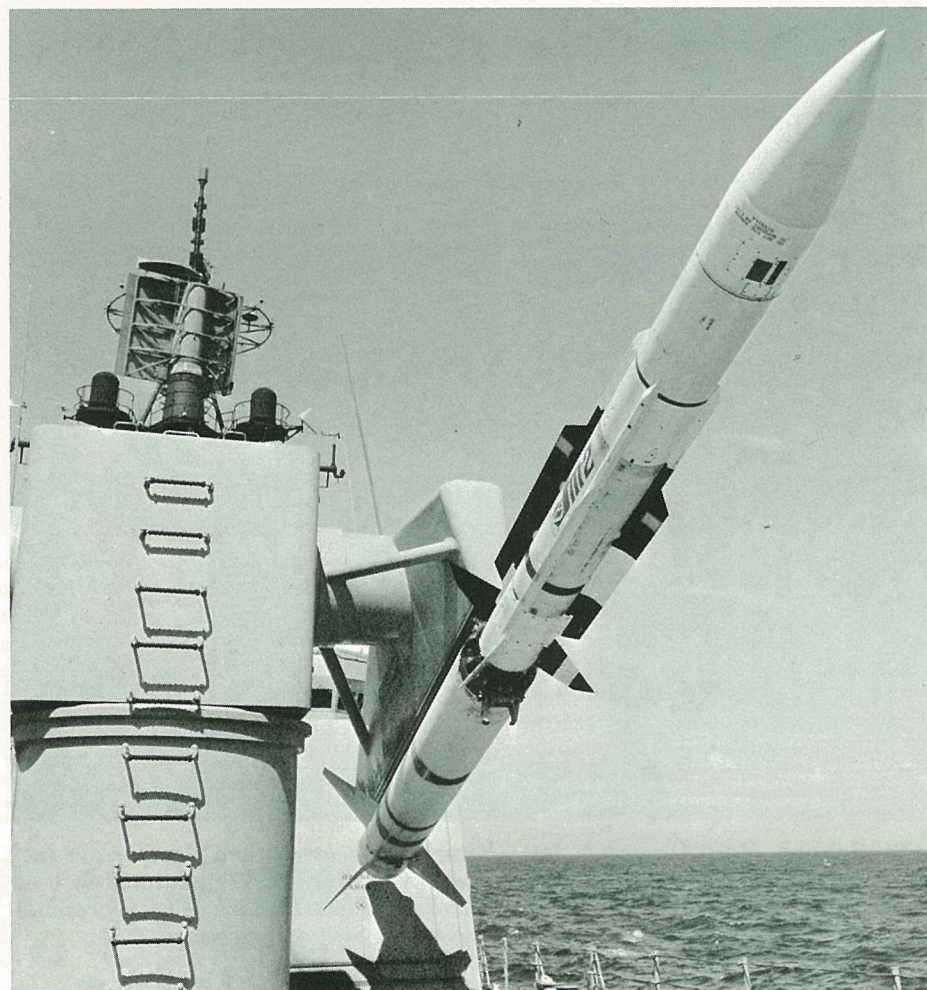
He explained that the facility is somewhat like a giant stereo:

"We are able to generate up to 36,000

watts of acoustic power through low-frequency woofer horns and high-frequency tweeter horns. The noise can build up to a sound level exceeding 156 decibels — far beyond the human tolerance," he said.

The facility is located in Building 66, which is made of solid concrete 12 inches thick. The control room is equipped with amplifier systems, sound analyzers and sound equalizers. Test engineers and lab technicians monitor the hardware specimens through instrumentation systems and a closed circuit television link.

The first hardware to be subjected to high-intensity sound bombardment will be the manipulator arm for the Space Shuttle Orbiter. The arm was designed and built by Convair Division to move space shuttle payloads in orbit. Acoustic testing of Tomahawk will get under way next year, Nirschl said.



The Standard Missile - 2

## Pomona Receives Contract For Continued SM-2 Work

Pomona Division and the Naval Sea Systems Command recently signed a \$71.5 million contract for the continued development of Standard Missile - 2 (SM-2) Block II Medium and Extended Range rounds.

Block II signifies a second set of improvements in the advanced weapons. Visibly, the difference between Medium and Extended range is the addition of a booster rocket in the extended version that will provide extra speed and range capabilities.

The SM-2 design includes changes that will make the guidance system com-

patible with the Terrier/Tartar and AEGIS weapons systems. The changes will allow the Navy to use present launching and handling gear with the new SM-2 designs.

These improvements will also be incorporated into the SM-1 Block VII program which recently was funded for \$2.2 million against a \$37 million contract for its development. The contract will be awarded in February 1979 for an improved dual thrust rocket motor in propulsion systems of Medium Range AEGIS and SM-2 Medium Range Tartar as well.

## Around the World... ...in GD

**At CHQ:** George M. Gales joined as Corporate Pilot . . . Jerry R. Tiaht joined as Corporate Manager, Aerospace Projects . . . Michael W. Wynne transferred from Fort Worth as Corporate Manager, Proposal Analysis . . . Paul H. Davis joined as Corporate Manager, Industrial Engineering.

**At Fort Worth:** Robert W. Riley was promoted to Project Engineer.

**At Convair:** Gerald L. Matthes was transferred from CHQ as Subsystems Cost Coordinator . . . Robert D. Bradshaw was promoted to Engineering Chief.

**At Pomona:** Dennis K. Benson was promoted to Senior Project Engineer . . . William M. Leonard was promoted to Director of Manufacturing Engineering . . . Nels G. Ohlson was promoted to Director of Manufacturing . . . Carl Snyder Jr. was promoted to Assistant Program Director.

**At Electric Boat:** George S. Backus has been promoted to Deputy Site Manager, Engineering & Technical Support, Bangor . . . Paul R. Huard has been promoted to Deputy Site Manager, Program Control, Bangor.

**At Electronics:** G. D. Goldshine transferred from Pomona and was named Director of Design Engineering.

**At Datagraphix:** Jim Conway was appointed Manager of Material Administration and Reader Manufacturing . . . Dick Hurst was appointed Manager of Production Control for Mainframe, Duplicator, Machine Shop, Charactron® Tube, A-New and Display Products . . . Ron Miller was appointed Manager of Material Control . . . Jack J. Martini was appointed New York District Sales Manager . . . James V. Stubbs was appointed National Accounts Manager.

**At GDCC:** Gina Frank was promoted to Office Administration Manager.



# New Method of Launching Subs Used for Jacksonville

An innovative method of launching submarines was unveiled under cloudless skies before a crowd of 5,000 on Nov. 18th as Electric Boat christened the high-speed attack submarine *Jacksonville*.

Formerly, submarines have been built on slanting ways and launched by releasing them to slide into the Thames River. The *Jacksonville*, on the other hand, was already in the water when it was christened, having been floated off its strongbacks by flooding the graving dock of Electric Boat's new 10 acre, \$150-million Land Level Submarine Construction Facility.

The *Jacksonville* is the only 688-class submarine that is scheduled to be launched from the facility which was built for the huge Trident submarines.

During the *Jacksonville* christening ceremony, EB General Manager P. Takis Veliotis said it was "a momentous, you

could even say historic, occasion."

The Land Level Facility, he said, "is a major commitment by General Dynamics to the future of Electric Boat. It is a commitment to our workers and their families. It is a commitment to the Navy that we will do whatever is necessary to upgrade our facilities and capabilities to serve the Navy's needs."

Part of the traditional launch ceremonies remained: "Anchor's Aweigh," played by the U.S. Coast Guard Band, and the bottle of champagne smashed against the submarine by the ship's sponsor, Mrs. Dorothy Jean Bennett, wife of U.S. Representative Charles E. Bennett, Democrat of Florida and Chairman of the House Seapower Subcommittee.

But the bottle of champagne was broken against the after end of the ship's fairwater, or superstructure, not the bow.

*Continued on Page 4*



Photo by Fred Webster

**Jacksonville Launch.** The SSN 688-class fast attack submarine *Jacksonville* floats in the EB graving dock following launching ceremonies on Nov. 18th. The *Jacksonville* is dwarfed by the first Trident submarine, the *Ohio*.

## GD World

Vol. 8 No. 9

2

December 1978

### Inside the World

Business Ethics and Conduct . . . . . Page 2

3d Quarter Earnings Set Record . . . . . Page 4

## ATC Broadens GD's Commercial Operations

American Telecommunications Corp. (ATC) has become the newest member of General Dynamics.

On Dec. 1st, David S. Lewis, Chairman and Chief Executive Officer, announced the acquisition of ATC had been completed, and the telecommunications equipment firm would operate as a wholly owned subsidiary of GD.

ATC is a fast growing, increasingly broad-based manufacturer of proprietary telecommunications equipment which it sells to telephone companies. Among its customers are the Bell System, General Telephone System and other independent telephone companies in the United States, Canada and overseas.

Its current products are decorator telephones, automatic telephone dialers, tone dialing conversion equipment for telephone company central offices, and telephone answering and recording machines.

Electronic private automatic branch exchanges (PABX) are manufactured in the United States by American Telecom, Inc., an affiliate company ATC owns jointly with Fujitsu, Ltd., one of Japan's largest telecommunications and computer manufacturing firms. A major customer of American Telecom's FOCUS elec-

tronic PBX is General Dynamics Communications Co.

Two of ATC's best known products are The Mickey Mouse Phone™ and The SNOOPY & WOODSTOCK Phone now being offered by the Bell System.

In the fiscal year ending April 30, 1978, ATC's total sales were \$39.6 million, with sales estimated to approach \$50 million in the current fiscal year.

The acquisition of the El Monte, Calif.-based ATC is an important step in broadening and strengthening GD's commercial operations, according to Guy W. Fiske, GD's Executive Vice President—Commercial.

"ATC and GD's other commercial operations fit together," Mr. Fiske says. "They have complementary product lines and market strengths."

The telecommunications industry has been an important part of GD's business for many years. Stromberg-Carlson Corp., headquartered in Tampa, Fla., was formed in 1894 and manufactures telephone central office switching equipment for independent telephone companies. General Dynamics Communications Co., formed five years ago and headquartered in St. Louis, sells and

*Continued on Page 4*



©Walt Disney Productions

**Holiday Greetings.** The Mickey Mouse Phone™ is manufactured by American Telecommunications Corp., the newest member of General Dynamics.

## Fifth LNG Tanker Named at Quincy Shipbuilding



Photo by Bob Fraher

**Leo Named.** Mrs. P. Takis Veliotis (left), sponsor of LNG Leo and wife of the GD Vice President and EB General Manager; her daughter, Miss Joanna Veliotis, and David S. Lewis, Chairman and Chief Executive Officer of GD, watch the traditional bottle of champagne smashing into the ship's bow.

LNG Leo, the newest addition to America's growing fleet of liquefied natural gas tankers, was named during formal ceremonies at Quincy Shipbuilding Division on Dec. 2d.

The 936-foot, 95,000-ton-tanker was named by Mrs. P. Takis Veliotis of Milton, Mass., wife of the GD Vice President who was former General Manager of Quincy Shipbuilding. Mr. Veliotis is currently General Manager of Electric Boat Division.

Speakers at the ceremony, which was attended by shipyard workers, their families and invited guests, included U.S. Senator-elect Paul E. Tsongas, Democrat of Massachusetts, and Robert J. Blackwell, Assistant Secretary of Commerce for Maritime Affairs. Other speakers were David S. Lewis, Chairman and Chief Executive Officer of GD, and Joseph H. Lennox, General Manager of Quincy Shipbuilding.

Mr. Blackwell, during his remarks at the ceremony, said that proposed pro-

jects involving the importation of natural gas into the United States have the potential for generating orders for as many as 32 additional American-built liquefied natural gas (LNG) tankers. The projects involve importing LNG from Algeria, Indonesia and Iran.

He expressed confidence that additional LNG shipbuilding orders would be forthcoming in the not-too-distant future to support these projects which are currently in various stages of regulatory review.

"I'm sure that General Dynamics' Quincy will be a formidable competitor for any shipbuilding orders that are generated by the projects," he said.

LNG Leo is the fifth of ten identical tankers being built at Quincy. The four Quincy-built ships that have been delivered previously have made 60 deliveries of LNG to Japan since beginning the Indonesia to Japan run in August 1977.



# Standards of Business Ethics and Conduct

## General

The purpose of this document is to reaffirm our Corporate policies on business ethics and conduct and to ensure that these policies are understood as they apply to overall standards of ethical behavior and to certain specific areas especially governed by laws and regulations. Our objective is to establish a framework of guidelines which will enable all employees to apply these policies to specific situations. These policies apply fully and equally to all employees of General Dynamics, its divisions and subsidiaries.

General Dynamics expects its employees to conduct themselves in such a way that if their activities became public knowledge there would be no embarrassment to the employee or to the Company. Employees are also expected to forego any business activity, personal or Company-related, which might conflict with the Company's interest or which would entail unethical or illegal actions. These basic principles relate to proper recording of funds, assets and disbursements, outside activities and the use of inside information. Employees are expected to observe the spirit of this code of conduct, which will frequently exceed legal requirements, as well as the letter of those laws and regulations pertaining to our operations in the United States and other countries in which we do business.

## Conflicts of Interest

Conflicts with the Company's best interest or breaches of trust or confidentiality are to be avoided in all instances. A business situation involving loyalty to both General Dynamics and another party is potentially a conflict of interest. This divided loyalty can reflect against the Company and compromise the individual's ability to make an objective decision. Often, there is an applicable legal rule or regulation that will determine whether or not an actual conflict of interest has occurred or will occur if a certain action is taken; but these regulations represent only minimum standards of conduct, and our mutual obligations extend much further.

The following guidelines should be observed with regard to conflict of interests:

1. General Dynamics employees and their immediate families may not solicit or accept gifts or entertainment of significant value or other valuable benefits intended to influence General Dynamics' business. Further, employees and their immediate families may not solicit or accept personal fees, commissions or other forms of remuneration because of transactions or business involving General Dynamics.
2. No employee of General Dynamics or any of its subsidiaries may serve as an official or a director of any other enterprise organized for profit without prior approval from General Dynamics. Advice is available from Division or Corporate Legal Counsel, but approvals must be given by General Managers or by the General Dynamics Chief Executive Officer as appropriate. It is desirable that no General Dynamics employee have any signifi-


## Fellow Employees:

*During the past few years General Dynamics has reestablished its reputation for technical leadership and as a formidable competitor in aerospace, shipbuilding, resources and telecommunications.*

*This is a great accomplishment and the credit for it belongs to the 76,000 men and women of General Dynamics located around the world. As great an achievement as this is, I believe that we can all take greater satisfaction in the fact that we have accomplished this without compromising our Company's reputation for integrity.*

*With this thought in mind, I believe it is important that now and again we review our Standards of Business Ethics and Conduct that form the cornerstone of our Company's reputation. These standards apply equally to all General Dynamics employees — to the thousands located in our U.S. divisions and subsidiaries and to the representative of the company on an international assignment.*

*These basic principles have served us well in the past, and all employees are expected to adhere to these definitive standards in the future.*



David S. Lewis  
Chairman

cant interests in any business venture which engages in transactions with the Company. Where such an interest does exist, either direct or indirect, business relations are not necessarily or automatically prohibited. A decision will depend on specific circumstances and the conclusions reached by Legal Counsel and the General Manager or Chief Executive Officer. However, in all cases, an employee having such an interest must remove himself in every way from involvement in setting the terms of the business transaction and from all phases of the procurement process.

3. No employee may make any actual or apparent commitments, formally or informally, regarding General Dynamics without proper prior authorization in accordance with existing procedures. All commitments must be promptly documented and confirmed. Selection of firms or individuals such as lawyers, consultants, sales representatives and others must always be predicated upon quality of service and competitiveness of price. Fees or commissions for other than clearly stated business purposes are not to be paid under any circumstances.

4. Transactions of a minor nature in foreign countries, involving small gratuities, are sometimes required to expedite processing of documents, customs clearances, transfers and other administrative permits. In these cases, Corporate or Divisional Legal Counsel should be consulted prior to any payment to insure that they are not in the prohibited category. Counsel must give prompt service to these requests to prevent delays in operations.

## Funds, Assets and Disbursements

All funds, assets and disbursements of the Company shall be properly recorded on the appropriate Corporate books and records. To ensure that this is done, the following specific supplemental requirements are directed:

1. No secret or unrecorded fund of Corporate monies or other assets of General Dynamics Cor-

poration or its subsidiaries shall be established or maintained and all payments and disbursements shall be properly recorded on the books and records of the Company.

2. The making of false or fictitious entries on the books and records of the Company or its subsidiaries and the issuance of false or misleading reports pertaining to the Company and its operations are prohibited.

3. No payment on behalf of the Corporation or any of its subsidiaries shall be approved or made with the intention or understanding that any part of such a payment is to be used for a purpose other than that described in the document supporting the payment.

4. No employee may improperly use Corporate property or material or permit others to do so.

5. Any officer or employee having knowledge of any act or circumstance which is prohibited by the above is required to report the matter to Corporate Legal Counsel.

## Classified, Company Confidential, and Inside Information

Many of the Company's divisions and subsidiaries are involved in programs which are vital to the national security of the United States and allied countries. It is General Dynamics' policy that the government regulations on the handling of all classified material are to be observed to the absolute letter.

In addition, General Dynamics is involved in many programs which require extreme confidentiality. Some of these involve information or concepts which cannot be patented but which, if publicly disclosed or made available to our competitors, might seriously and adversely affect the future of our programs and, in turn, the job security those programs provide for our employees. The general rule to follow in safeguarding Company confidential information is that disclosure should be made only to those individuals within the Corporation with a "business need to know." Each employee is responsible for protecting all Company Private

Data against improper dissemination.

"Inside information" involves confidential, nonpublic Company information pertaining to Company plans or operations or the results thereof. Use of inside information by any individual for his own personal gain or that of his family or friends is prohibited by law. Personal transactions in securities, commodities, physical property, real estate and similar items should not be made on the basis of inside information. Further, General Dynamics employees are prohibited by law from communicating inside information to relatives or friends if the information might subsequently be used by these acquaintances for personal economic gain. This rule applies to all employees of the Company and also to outside consultants and representatives to whom such information is necessarily disclosed in the course of business.

## Political Contributions

General Dynamics does not under any circumstances permit the use of Corporate funds for national, state or local political campaign contributions or other related purposes. This prohibition covers direct contributions of money, gifts, services or other Corporate resources to political parties or candidates. It also applies to support through less direct means, such as using Company funds to purchase tickets for dinners or other fundraising events, or providing services to candidates by our employees on Company time.

General Dynamics strongly supports and encourages its people to participate on an individual basis in political activities on their own time and in their own way. Nothing in this policy is intended to inhibit voluntary individual support of candidates or political parties or participation in the General Dynamics Voluntary Political Contribution Plan.

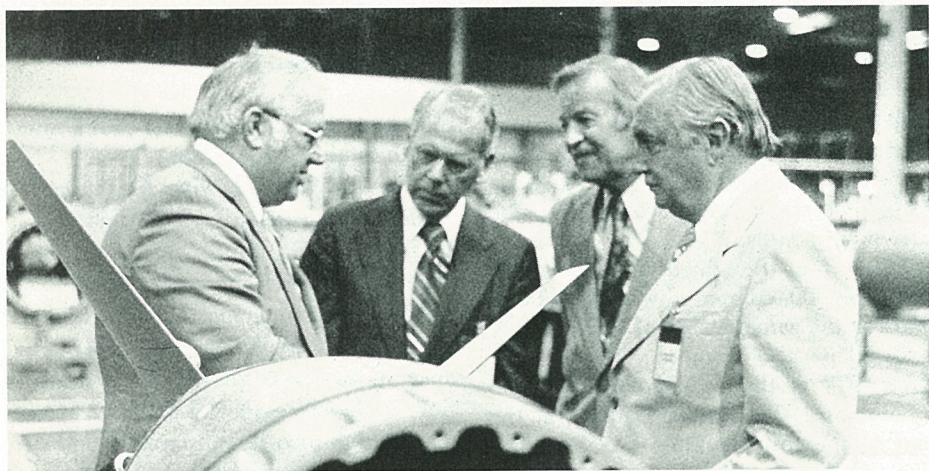
## Fairness in Dealing with Others

General Dynamics customers, potential customers and their employees and representatives must be treated with respect and consideration. We must extend to them the courtesy of recognizing and complying with any standards of ethical conduct which have been developed for their guidance by their corporate organizations. For example, most governmental agencies either have special standards which are in place or are being formulated. We must continue to observe our own standards, but to the extent that any additional or more stringent requirements are imposed by an organization with which we might deal, it is our job to comply with them and to assist others in complying with them as well.

## Conclusion

The intent of this restatement of our Corporate policies on ethics and conduct is to establish a framework within which each employee can work effectively towards the Company's goals. We obviously have not attempted to prescribe rules for every circumstance. What is called for is a positive attitude and a commonsense approach by employees in following these admittedly high standards.





**Congressional Visit.** Dr. L. F. Buchanan, Convair General Manager (left), answers questions from U.S. Representatives Clair Burgener, Lionel Van Deerlin, and Bob Wilson during their recent visit to Convair. The Representatives visited Convair for program briefings and a plant tour.

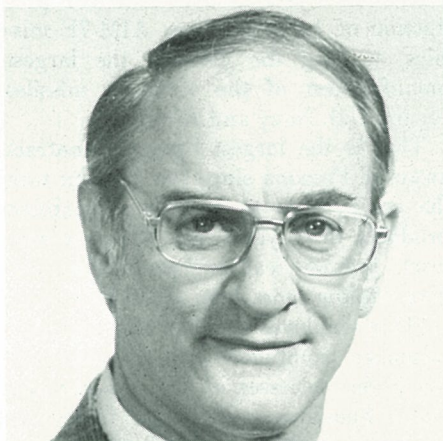
## Convair's Eric Herz Elected GM Of National Engineering Institute

Eric Herz, a senior project engineer at Convair, has been named General Manager of the Institute of Electrical and Electronics Engineers (IEEE).

Mr. Herz will assume leadership of the world's largest engineering society on January 1st. More than a thousand General Dynamics engineers are members of the IEEE, according to Herz.

He joined Convair Division in 1957. His assignments included work in elementary data processing stations and test equipment, digital range measuring and communication systems and avionics related studies. Since 1974, he has been on the cruise missile program and most recently was product manager for support equipment for the air-launched cruise missile flyoff competition.

A member of the IEEE since 1955, Herz has been active in regional and technical business and currently is Vice President for Technical Activities. He is also a member of the IEEE Board of Directors.



**Eric Herz**

Herz was graduated from the Polytechnic Institute of New York in 1952 with a bachelor's degree in electrical engineering. He has also pursued graduate studies at Adelphi College in New York, the University of California at Los Angeles and Pepperdine University in California.

## Sodium Lamps Will Reduce Energy Needed at Convair

High-pressure sodium lamps, an efficient and economical light source developed for industrial use, are being installed at Convair Division's Kearny Mesa Plant.

Joe Dragonetti, Convair's Resources Conservation Coordinator, said that the 150-watt high pressure lamps emit about 125 lumens per watt versus about 82 lumens for standard fluorescent lamps. (A lumen is a unit of measure for the flow of light.)

"It takes about 1.5 watts to illuminate a square foot with the sodium lamps," he said. "This is about 50 percent less power required to obtain the same level of light with fluorescents."

The new lamps and their fixtures are being placed about 10 feet apart as opposed to the continuous rows of the current fluorescents and their fixtures.

He pointed out that the new light installations will pay for themselves within 15 months through energy savings. Additionally, the rated average life of the sodium lamps is about 24,000 hours compared to 15,000 hours for fluorescent lamps.

The high-pressure sodium lamps use a two-element discharge gas composed of mercury vapor and sodium vapor — a combination that is said to be particularly effective because the sodium atom has its maximum output at the peak of the human eye response.

Thus far, the lights have been installed in the factory support office area, the maintenance office, Tomahawk check-out area, and the Tomahawk avionics manufacturing area. They are being installed in the Tomahawk final assembly area.

## Convair Service Awards

### 35 Years

**Operations:** J. I. Sather, H. S. Murphy, J. Caldwell, C. G. Rojas, R. J. Karash, W. G. Harrison, J. B. Hinojos, J. P. Lalanne, A. W. Young.

**Finance:** E. W. Danos.

### 30 Years

**Operations:** N. R. Hastings, R. L.

Brown Jr., M. L. DeShon, J. P. Hannibal, B. J. Jeffries, R. P. Armenta, E. O. Barnes, I. T. Heckman.

**Quality Assurance:** F. M. Peterman.

### 25 Years

**Operations:** F. G. Herrera, D. M. Dvorak, D. Ashcraft, J. E. Lemon, J. W. Jackman, F. Puchahes, A. E. McFarland, C. H. Fenstermacher, H. R. Moline, M. T. Grove Jr., C. B. Pierce, M. Trbovich.

**Finance:** E. M. Larson.

**Industrial Relations:** M. B. Fickas, S. R. Sharp.

**Research and Engineering:** C. A. Lab.

**Launch Vehicle Programs:** H. J. Hastings.

**Material:** M. C. Fink.

**Contracts:** J. R. Alameda.

## Lester Crown Is Speaker At CMA Dinner Meeting

More than 500 Convair Management Association (CMA) members and guests turned out for Top Management Night to hear Lester Crown, General Dynamics Executive Vice President and President of Material Service Corp., discuss the growth and potential of Material Service.

CMA's Top Management Night was held Oct. 30th and was hosted by Seymour Zeenkov of the Manufacturing Engineering Department. Also on the program was Bob Daly, Convair Division Vice President of Operations, who received the Silver Knight of Management Award.

Mr. Crown's illustrated talk described the product lines of Material Service, Freeman United Coal Mining Co., Marblehead Lime Co., Darlington Brick & Clay Products Co. and Powell & Minnock Brick Works, Inc.

Mr. Daly was cited for his outstanding qualifications and many contributions of leadership resulting in his distinguished service to the management profession. The Silver Knight award is the highest honor that can be given by a National Management Association chapter. It was presented by Bob Hinck, CMA President, and Joe Moore, immediate Past President of CMA.



**Silver Knight.** Bob Daly, Convair Vice President of Operations, displays the Silver Knight of Management. At left are Joe Moore, CMA Past President and Bob Hinck, CMA President.

## Blackshaw Named Convair Vice President

George E. Blackshaw has been appointed Convair Division Vice President for Research and Engineering reporting to Dr. L. F. Buchanan, Division General Manager. He replaces Dr. Raymond F. Beuligmann who was named Program Director for Energy Systems.

Mr. Blackshaw joins Convair from the Department of Defense where he was Director for Tactical Missiles in the Office of the Under Secretary of Defense for Research and Engineering. His back-

ground also includes broad missile experience in both the Air Force and industry.

Blackshaw was graduated from California Polytechnic in 1958 where he earned a Bachelor of Science degree in Aeronautical Engineering.

A native of Bakersfield, Calif., Blackshaw is a member of the Air Force Association, American Defense Preparedness Association, and the Defense Science Board.

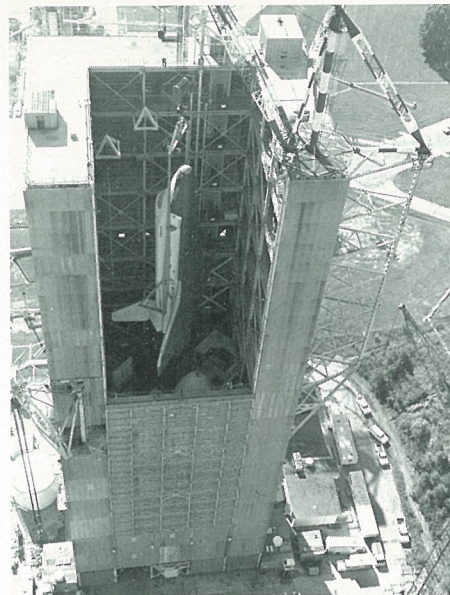
## Astronomy Satellite Boosted into Orbit By GD's Atlas-Centaur

A General Dynamics-built Atlas-Centaur launch combination last month successfully sent the second High Energy Astronomy Observatory (HEAO) into orbit from Cape Canaveral, Fla.

According to Bob Benzwi, Convair Division's HEAO Mission Manager, the HEAO spacecraft weighing nearly 7,000 pounds was the heaviest yet placed in orbit by Atlas-Centaur.

Following the flawless early morning liftoff Nov. 13, HEAO 2 was placed in a 290 nautical-mile orbit. The observatory became fully operational three days later following checkout to determine that it was functioning satisfactorily in its near-perfect Earth orbit.

Carrying a focusing X-ray telescope and a variety of sensitive instruments, HEAO 2 will maneuver and point for long periods of time at selected X-ray sources already identified by its predecessor, HEAO 1. The first observatory was launched last year aboard an Atlas-Centaur to conduct a general X-ray sky survey.



**Easy Does It.** The Space Shuttle Orbiter Enterprise is lowered into a test stand at the Marshall Space Flight Center at Huntsville, Ala., where the Enterprise was mated with an external propellant tank and two solid rocket boosters — the first time all Shuttle elements have been assembled. The orbiter's payload bay measures 60 feet long, 17 feet wide, and 13 feet high, and weighs 13,400 pounds. It was built at Convair.

## GD World

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G. Alexander Smith — Manager of internal communication

L. Christine Cascella — Associate Writer  
Jack Isabel — Contributing editor, Convair Edition



# GD Third Quarter Earnings Highest Ever

General Dynamics' third quarter earnings of \$39,772,000, or \$3.75 per share, were the highest of any quarter in the corporation's history. This compares with \$25,526,000, or \$2.34 per share, during

the same period last year.

However, after consideration of the second quarter loss of \$186.7 million resulting from the negotiated settlement made with the U.S. Navy on two con-

struction contracts for 688-class submarines being built by the Electric Boat Division, a net loss of \$96,410,000, or \$9.00 per share, was recorded for the first nine months.

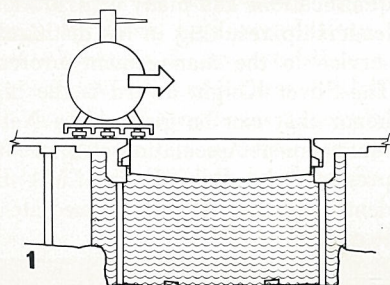
Sales for the third quarter were \$836,038,000, compared with \$704,667,000 for the same period of 1977.

Backlog also showed improvement over 1977 at the end of the first nine months of 1978. Funded backlog at the end of the third quarter was \$8.1 billion, an increase of 40 percent. Total funded and unfunded backlog was \$9.8

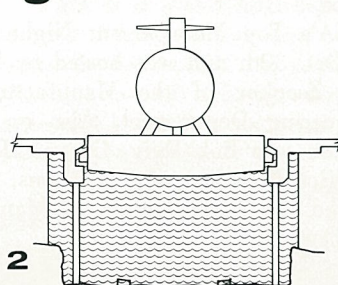
billion, an increase over last year's nine-month total of \$7.2 billion.

"We are pleased with the progress made by the company so far this year," said David S. Lewis, Chairman and Chief Executive Officer of General Dynamics, in announcing the third quarter financial results. "The record performance in the past quarter is an indication of the strength and stability of our many high-priority programs and we are very encouraged about the company's future prospects."

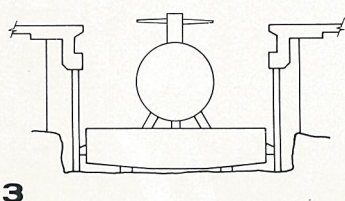
## New Sub Launching Procedure



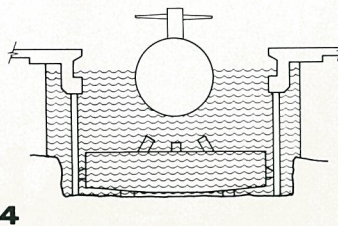
1 Submarine is transferred onto pontoon and transfer cars are removed.



2 Graving dock is flooded above river water level to float pontoon clear of supports. Graving dock is then pumped down to lower pontoon.



3 Pumpdown is continued until dock is dry and pontoon is grounded on blocks. Flood port covers are removed from pontoon.



4 Graving dock is reflooded. At the same time water also enters pontoon through flood ports; flooded pontoon remains at bottom of dock, and ship floats free of strongbacks.

## Jacksonville Launched at Groton

Continued from Page 1

The actual launching process began the week before the ceremony when a team of 17 carpenters, riggers and electricians moved the sleek sub 75 feet sideways onto the pontoon.

In the move, the ship rode 17 strongbacks propelled by 38 electric motor driven transfer cars — key elements in the most advanced complex of its type in the Free World. Then the graving dock was readied to float the Jacksonville.

The new launching operation involves superflooding the dock above the river level to float the pontoon clear of its supports and pumping the graving dock out to lower the pontoon to the bottom (see diagram above). Then the dock and the pontoon are flooded simultaneously. The pontoon remains on the bottom of the dock and the ship floats free. The dock holds 37 million gallons of water when full and the flooding process takes slightly more than 12 hours.

## ATC Acquisition Broadens GD

Continued from Page 1

services interconnect switching systems which link private office or organizational telephone systems with commercial telephone lines.

ATC was founded by Henry Marcheschi and Jim Langworthy 11 years ago.

Mr. Marcheschi read in a business newspaper that American Telephone and Telegraph Co. (AT&T) was allowing its customers to purchase decorator telephone shells from private manufacturers and then have AT&T install the telephone mechanisms.

"I became fascinated with the variety of possibilities this market represented," Marcheschi says. "I felt there was a broad market where a small company could do rather well."

ATC was founded in 1968, and the tiny firm's first business was supplying General Telephone of California with unique chest and cradle model telephones.

ATC concentrated its early efforts on

developing decorator telephones and within a few years was the world's leading manufacturer — a position which it still holds today.

Marcheschi, Chairman and President of ATC, is a native of Chicago and received a Bachelor of Science degree from the University of Illinois in mechanical engineering. Prior to founding ATC, he was the president of a private venture capital firm.

"General Dynamics has a demonstrated record of innovations," Marcheschi says. "With GD behind it, ATC will be able to capitalize on its full potential."

## F-16 a Finalist For Canadian Fighter Contract

The Canadian government has selected the General Dynamics F-16 and the McDonnell Douglas F-18A as final contenders in the competition for selection of a new fighter aircraft.

The contract will involve between 130 and 150 aircraft and is valued at a maximum of 2.34 billion Canadian dollars.

The competition was narrowed from a field of six aircraft which included the Grumman F-14, the McDonnell Douglas F-15, the Panavia Tornado and the Northrop F-18L.

The winner of the competition is planned to be the mainstay fighter aircraft for the Canadian armed forces until the end of this century.

## Savings and Stock Investment Values

The Stock and Saving Plan unit values in dollars for the month of October are as follows:

<b>Salaried:</b>	
Government Bonds	\$2.0484
Diversified Portfolio	\$1.2348
<b>Hourly:</b>	
Government Bonds	\$2.0476
Diversified Portfolio	\$1.2626
General Dynamics Stock	\$ 65.00

## Pomona Becomes Navy's Major Sparrow Producer

The Pomona Division has been awarded an \$81,352,310 contract by the Naval Air Systems Command for production of 1,310 Sparrow AIM-7F missiles, making the division the largest manufacturer of the air-to-air missiles for the U.S. Navy and Air Force.

This is the largest Sparrow contract awarded Pomona since the division won the competition to become a qualified producer three years ago. The new contract follows earlier production orders totaling more than 1,200 Sparrows.

"Our employees' quality and cost performance, combined with the outstanding flight successes of the Pomona-produced Sparrows were major factors in our earning this contract," said Ralph Hawes, Pomona General Manager.

"Every member of the Sparrow team, including the assemblers, test technicians and engineers, can be proud of their achievements," added Dick Nesbit, Pomona Sparrow Program Director.

The new contract is for Fiscal Year 1979 production. Actual delivery of this order will begin in January 1980.

Sparrow AIM-7F is an aircraft defense

missile used on Navy and Air Force fighters.

Pomona recently received authorizations and funding to increase its production capacity from 50 to 100 Sparrows per month. The division produces the guidance and control sections, radomes, warhead metal parts and wings for the 12-foot-long, 8-inch-diameter missile.

Mr. Nesbit notes that in addition to the division's production record, Pomona has contributed improvements to Sparrow. These include a new Von Karman radome design to improve guidance accuracy, and wing design improvements to eliminate flutter under high dynamic pressure.

Recent Navy and Air Force test and evaluation programs have proven Sparrow AIM-7F the most reliable air-to-air missile in the U.S. inventory.

Sparrow is only one of several major production contracts earned by the Pomona Division this year. Other programs entering production at Pomona include the Phalanx radar controlled gun system, Standard Missile-2 and the Stinger manportable air defense system.

## Around the World... ...in GD

**At CHQ:** Donald G. Norman joined as Corporate Manager, Engineering Personnel Services . . . Annette M. Leps was promoted to Corporate Financial Analyst - Aerospace . . . Thomas J. Rule was promoted to Corporate Photographer/Photo Editor . . . Marcella M. Zweifel was promoted to Production Control Analyst . . . Raymond D. Jones transferred from Convair as Corporate Marketing Manager - Europe.

**At Pomona:** William G. Kormalis transferred from St. Louis as Material Cost Analyst, Senior . . . Raymond L. Ottaway was promoted to Manager, Advanced Manufacturing . . . Robert C. Walters joined as Engineering Specialist . . . John M. Yuh joined as Design Specialist . . . Joseph M. Pennisi was promoted to Assistant Program Director.

**At Convair:** John A. Brown joined as Engineering Specialist . . . James T. Karam Jr. joined as Manager - Systems Integration . . . Howard L. Newman was promoted to Project Manager Senior . . . Edwin M. Squires was promoted to Manager - Estimating . . . Robert P. DiNal was promoted to Engineering Chief . . . Kent Parra transferred from St. Louis and was promoted to Marketing Manager.

**At Electric Boat:** Richard F. Shane was promoted to Manager of Administrative Services . . . Louis E. Pokos was promoted to Deputy Site Manager - Construction.

**At Electronics:** R. R. Coffman transferred from Fort Worth as Program Manager . . . Thomas J. Lapham joined as Program Manager . . . Walter Fairbanks Jr. joined as Program Director - Tactical Data Systems.

**At Fort Worth:** Wendell M. Calhoon joined as Manager of Finance . . . Michael J. Childs joined as Operations Director (Iran) . . . Darryl R. Frank was promoted to Manager of Finance . . . Ronald M. Southern was promoted to Director of Financial Planning & Control . . . William C. Donnelly was promoted to Manager of Facilities Integration (Iran) . . . Peter E. Miller Jr. joined as Chief of Quality Assurance . . . Anthony D. Bowlds transferred as Marketing Manager . . . John L. Garrett joined as Engineering Specialist Senior . . . Robert D. Stodghill was promoted to AIS Program Manager.

**At Stromberg-Carlson:** W. Thomas Wilson was appointed Sales Representative.

**At DSS:** Harold R. Hickman was promoted to Chief - Engineering Software for Central Data Systems Center . . . David F. Hopkins transferred from Central Data Systems Center to St. Louis as Technical Systems Specialist.